Vol. 1066 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

May 6, 1986

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

May 6, 1986 Volume 1066 Number 1

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1052 O.G. 52 on Mar. 26, 1985.

For use of the European Patent Office as Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic FCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office has been changed as of Feb. 9, 1986 and is announced in the *Official Gazette* at 1061 O.G. 30 on Dec. 31, 1985.

International PCT fees have been changed effective Jan. 1, 1986 and were announced in the *Official Gazette* at 1061 O.G. 30 on Dec. 31, 1985.

Note that the amount of the international search fee for the European Patent Office and the amounts of the International PCT fees will change effective June 1, 1986. For information on these fee changes see the notice appearing in the *Official Gazette* at 1065 O.G. 41 on Apr. 29, 1986.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority	
—No corresponding prior U.S. national application filed	420.00
—Corresponding prior U.S. national application filed	250.00
European Patent Office as Searching Authority	
if paid before June 1, 1986	830.00
if paid on or after June 1, 1986	930.00
International fees	
Basic fee (first 30 pages):	
if paid before June 1, 1986	325.00
if paid on or after June 1, 1986	375.00
Basic Supplemental fee (for each page over 30):	
if paid before June 1, 1986	6.00
if paid on or after June 1, 1986	7.00
Designation fee for the first 10 national or regional offices:	
if paid before June 1, 1986	80.00
if paid on or after June 1, 1986	90.00
Designation fee for 11th and subsequent designations	No charge

DONALD J. QUIGG,
Mar. 31, 1986. *Assistant Secretary and Commissioner of Patents and Trademarks.*

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 3, 1983, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,381,567 through 4,382,300
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED FEBRUARY 16, 1986 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 31.316	06/367,381	7/19/83
(4,315,731)	(06/242,362)	(2/16/82)
4,315,803	06/225,022	2/16/82
4,315,929	06/228,852	2/16/82
4,315,945	06/247,321	2/16/82
4,315,953	06/239,048	2/16/82
4,316,271	06/224,897	2/16/82

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,431,933, Re. S.N. 828,145, Filed Feb. 7, 1986, Cl. 310/239, BRUSH HOLDING DEVICE, Takaichi Mabuchi, Owner of Record: *Mabuchi Motors Co., Ltd., Tokyo, Japan,* Attorney or Agent: John J. Byrne, et al., Ex. Gp.: 212

4,537,680, Re. S.N. 839,611, Filed Mar. 14, 1986, Cl. 210/316, INTEGRAL FLUID FILTER AND CAPILLARY, Phillip Barth, Owner of Record: *The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.,* Attorney or Agent: Paul D. Flehr, et al., Ex. Gp.: 136

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

No Publications This Issue.

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

E.R.M.I., Inc., New York, N.Y., Reg. No. 1,235,992, for the mark "PERIDYNE", Canc. No. 15,243.

Prime Time Productions, Ltd., Silver Spring, Md., Reg. No. 1,203,975, for the mark "PEACHES & HERB and Design", Canc. No. 15,281.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

Names and Addresses of Registered Practitioners Reinstated on the Active Roster

The following is a list of persons whose names have been previously been removed from the Register of Attorneys and Agents pursuant to the provisions of 37 CFR 10.11(b), and are being reinstated in view of the required fee and information they have furnished the Office of Enrollment & Discipline.

Apr. 8, 1986. CAMERON WEIFFENBACH,
Director, Office of
Enrollment & Discipline.

Bass, Robert W., P.O. Box 85035, Las Vegas, Nev. 89135
Berger, Melvin G.; Brand & Leckie, 1901 L St., N.W., Washington, D.C. 20036
Brown, Daniel H.; Rheem Manufacturing Co., 59 Maiden La., New York, N.Y. 10038
Castro, Anthony J.; Akzo Chemie America, 2035 9th Ave., San Francisco, Calif. 94116
Connors, Edward J. Jr.; Box 480, 964 Shippan Ave., Stamford, Conn. 06904
Dula, Arthur M.; Dula, Shields & Egbert, 6960 Texas Commerce Tower, Houston, Tex. 77002
Freudenberg, Maxwell C.; P.O. Box 9182, Alexandria, Va. 22304
Holz, Arthur F.; 4550 Kearny Villa Rd., Suite 202, San Diego, Calif. 92123
Paul, James W., Fulwider, Patton, Rieber, Lee & Utecht, 11 Golden Shore, Suite 510, Long Beach, Calif. 90802
Sachtjen, Peter D.; Body, Vickers & Daniels, 2000 Terminal Tower, Cleveland, Ohio 44114
Saffrey, Roy H.; Fetherstonhaugh & Co., 439 University Ave., Toronto, Canada M2K 1M5
Sapelli, Arthur A.; Honeywell, P.O. Box 8000, M/S B55, Phoenix, Ariz. 85066
Sayko, Andrew F. Jr.; Celanese Corp., One Main St., Chatham, N.J. 07928
Schafrann, Jonathan B.; 17 Arlington Dr., Croton-on-Hudson, N.Y. 10520
Scharf, Aaron M.; 812 Spinnakers Reach Rd., Ponte Verda, Fla. 32082
Schekman, Howard B.; Jet Propulsion Lab/Cal. Institute of Tech. Mail Stop 180/302, 4800 Oak Grove Dr., Pasadena, Calif. 91109
Scheier, Floyd S.; 391 McKinney Rd., Wexford, Pa. 15090
Schiffmiller, Martin W.; Kirschstein, Kirschstein, Ottinger & Israel, P.C., 551 Fifth Ave., New York, N.Y. 10176
Schiller, David M.; 46 Rio Vista Drv., Stuart, Fla. 33494
Scholz, Louis A.; 850 Rt. 32, Sykesville, Md. 21784
Scrivener, David S.; Scrivener, Clarke, Scrivener & Johnson, 1776 K St., N.W., Suite 509, Washington, D.C. 20006
Schultz, Sandra S.; 237 G. Broadwalk, San Bruno, Calif. 94066
Scrivener, Samuel, Jr.; Scrivener, Clark, Scrivener & Johnson, 1776 K St., N.W., Suite 509, Washington, D.C. 20006
Serbin, Richard S.; 61 Monroe Ave., Roseland, N.J. 07068

Serbin, David J.; Schwartz, Jeffery, Schwaab, Mack, Blumenthal & Koch, P.C., 111 N. Alfred St., P.O. Box 229, Alexandria, Va. 22313
Seward, Gordon B.; Monsanto Co., 260 Springside Dr., Akron, Ohio 44313
Sgarbossa, Peter J.; Varian Associates, Inc., 611 Hansen Way, Palo Alto, Calif. 94303
Shaievitz, Sidney; Shaievitz & Berowitz, 554 Bloomfield Ave., Bloomfield, N.J. 07003
Sheridan, James A.; Flehr, Hohbach, Test, Albritton & Herbert, 260 Sheridan Ave., Palo Alto, Calif. 94306
Sherman, Sylvan; 280 Woodbine Cir., New Providence, N.J. 07974
Sherman, William R.; 15 Gay St., Nantucket, Mass. 02554
Shurupoff, Lawrence, Jr.; Federal-Mogul Corp., P.O. Box 1966, Detroit, Mich. 48235
Simonton, Pamela A.; Malin, Haley, McHale & Barron, P.A., One Financial Plz., Suite 2110, Ft. Lauderdale, Fla. 33394
Slabey, Vernon A.; 1551 Saunders Dr., Wooster, Ohio 44691
Slater, Robert W.; McDougall, Hersh & Scott, 135 S. LaSalle St., Chicago, Ill 60603
Smith, Joseph H.; 4410 Cosa Madeira La., San Jose, Calif. 95127
Smith, Richard G.; Fay, Sharpe, Fagan, Minnich & McKee, 400 National City-East 6th Street Bldg., Cleveland, Ohio 44114
Sniado, John L.; 2 Eve La., Rye, N.Y. 10580
Snider, Ronald R.; Wegner & Bretschneider, P.O. Box 18218, Washington, D.C. 20036
Sobanski, Mark J.; Marshall & Melhorn, Four Seagate-8th Fl., Toledo, Ohio 43604
Sobel, Paul A.; 120 Hunters Creek, Shelton, Conn. 06484
Spool, James; Siebe North, Inc., 4090 Azalea Dr., Charleston, S.C. 29405
Sprowl, James A.; Itt Chicago-Kent College of Law, 77 S. Wacker Dr., Chicago, Ill 60606
Stallman, Michael A.; Limbach, Limbach & Sutton, 2001 Ferry Bldg., San Francisco, Calif. 94111
Stan, John; Naval Ocean Systems Center, San Diego, Calif. 92152
Steffin, William C.; Lyon & Lyon, 611 W. Sixth St., 34th Fl., Los Angeles, Calif. 90017
Steininger, Charles F.; Phillips Petroleum Co., P.O. Box 2443, Bartlesville, Okla. 74005
Steinkraus, Walter J.; Locite Corp., 705 N. Mountain Rd., Newington, Conn. 06111
Steinmeyer, Robert J.; 609 Lemon Hill Terr., Fullerton, Calif. 92632
Stenstrom, Dennis G.; Burroughs Corp., One Burroughs Pl., Detroit, Mich. 48232
Stern, Edward; 2614 Nassau Bend, B-1, Coconut Creek, Fla. 33066
Stevens, Eugene E., III; HQ USAF/JACP, 1900 Half St., S.W., Rm. 5160, Washington, D.C. 20324
Stevens, Lloyd B., Jr.; 1359 Tattersall Rd., Dayton, Ohio 45459
Stewart, Richard C.; Allied Corp., P.O. Box 2245R, Columbia Rd. & Park Ave., Morristown, N.J. 07960
Stidham, Melvin R.; 165 N. Redwood Dr., Suite 165, San Rafael, Calif. 94903
Strom, Louis J.; University of California, 2490 Channing Way, Berkeley, Calif. 94720
Sughrue, Richard C.; Sughrue, Mion, Zinn, Macpeak & Seas, 1776 K St., N.W., Washington, D.C. 20006
Sweeney, James R.; McWilliams, Mann, Zummer & Sweeney, 53 W. Jackson Blvd., Suite 1215, Chicago, Ill. 60604
Sykes, Judith L.; Bristol-Myers Co., 345 Park Ave., New York, N.Y. 10154
Wood, Gregory B.; Nilsson, Robbins, Dalgarn, Berliner, Carson & Wurst, 707 Wilshire Blvd., Suite 4750, Los Angeles, Calif. 90017

PATENT NOTICES

Certificates of Correction for the Week of May 6, 1986

4,048,318	4,523,039	4,549,724	4,562,093
4,297,637	4,523,248	4,550,156	4,562,399
4,307,771	4,524,394	4,550,225	4,562,594
4,321,730	4,525,045	4,550,979	4,563,352
4,370,385	4,525,459	4,551,026	4,563,810
4,410,826	4,531,753	4,551,140	4,564,127
4,429,054	4,533,248	4,551,817	4,564,226
4,431,111	4,533,663	4,552,573	4,564,441
4,448,583	4,534,235	4,552,601	4,564,634
4,451,897	4,536,184	4,553,042	4,564,911
4,463,658	4,538,235	4,553,071	4,565,000
4,468,664	4,538,398	4,553,628	4,565,035
4,469,227	4,538,768	4,553,968	4,565,123
4,483,040	4,539,569	4,555,100	4,565,186
4,483,172	4,540,745	4,555,973	4,565,342
4,485,348	4,541,012	4,556,402	4,565,474
4,485,494	4,541,906	4,556,972	4,565,475
4,493,440	4,542,033	4,557,309	4,565,610
4,493,642	4,542,679	4,557,322	4,565,689
4,495,357	4,543,083	4,557,640	4,565,735
4,497,002	4,544,549	4,557,928	4,565,773
4,498,300	4,545,111	4,558,480	4,566,070
4,500,494	4,545,718	4,558,826	4,566,150
4,503,052	4,546,057	4,558,888	4,566,444
4,503,085	4,546,256	4,559,521	4,567,072
4,504,555	4,546,300	4,559,610	4,567,913
4,505,325	4,546,414	4,559,713	4,568,460
4,505,591	4,547,036	4,560,017	4,569,262
4,510,737	4,547,378	4,560,285	4,569,850
4,513,479	4,547,942	4,560,528	4,569,881
4,518,683	4,548,171	4,560,679	4,569,953
4,521,727	4,548,925	4,561,913	
4,521,758	4,548,966	4,562,047	

Disclaimer

4,436,806.—*Francis J. Rendulic,* Sudbury; *Robert K. Trasavage,* Whitinsville, Mass.; and *Paul A. Boduch,* Lakewood, Colo. METHOD AND APPARATUS FOR MAKING PRINTED CIRCUIT BOARDS. Patent dated Mar. 13, 1984. Disclaimer filed Nov. 12, 1985, by the assignee, *W. R. Grace & Co.*

Hereby enters this disclaimer to all claims of said patent.

Disclaimer and Dedication

4,074,752.—*Seymour Schlosberg,* East Brunswick, N.J. LUBRICANT COOLING APPARATUS. Patent dated Feb. 21, 1978. Disclaimer and Dedication filed Mar. 14, 1986, by the assignee, *De Dietrich (USA), Inc.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext.21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 264-4481
Arizona	Tempe: Science Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2122
Delaware	Newark: University of Delaware Library	(302) 451-2238
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1706
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4283
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Cambridge Springs: Alliance College Library	(814) 398-2098
	Philadelphia: Franklin Institute Library	(215) 448-1227
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2372
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 749-4176
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF March 29, 1986

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	4-01-85
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-84
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	12-18-84
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	3-01-85
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	3-02-84
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	11-14-83
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	11-21-83
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—E. E. KUBASIEWICZ, Director	1-22-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director	3-28-83
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	8-30-83
DESIGN, GROUP 290—K. L. CAGE, Director	1-03-84
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	7-12-83
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-11-84
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	8-18-83
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	4-25-84
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	7-01-85

Expiration of patents: The patents within the range of numbers indicated below expire during March 1986, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,430,260 to 3,435,459, inclusive

Plant Patents ..... Numbers 2,870 to 2,875 inclusive

REEXAMINATIONS

MAY 6, 1986

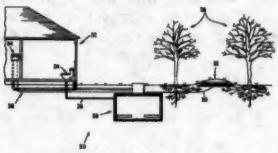
Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,925,206 (496th)

SYSTEM FOR HOME WASTEWATER TREATMENT AND DISPOSAL

Stanley J. Dea, 7 Dogwood La., Glen Head, N.Y. 11545

Reexamination Request No. 90/000,470, Nov. 23, 1983.
Reexamination Certificate for Patent No. 3,925,206, issued Dec. 9, 1975, Ser. No. 509,572, Sep. 26, 1974.
Int. Cl.[4] B01D *21/24;* C02C *5/04*
U.S. Cl. 210—104



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–7 are cancelled.

[1. A system for the aerobic batch treatment of wastewater and for the disposal of said treated wastewater in an above-ground disposal field, said system being suited for use in a locale where the existing soil displays unsuitable percolation capabilities, said system comprising:

a unitary treatment tank assembly for receiving and treating said wastewater, said tank assembly having inlet means for receiving said wastewater from and outlet means including means for transporting said treated wastewater from said tank to said disposal field, said treatment tank assembly further including means for aerating said wastewater to aerobically treat said wastewater while said wastewater is in said tank, said tank assembly further including means for pumping said aerobically treated wastewater through said outlet means out of said tank to said disposal field;

means for sequentially operating said aerating means for a first preselected period of time and said pumping means for a second preselected period of time to provide batch treatment and disposal of said wastewater; and

an above-ground disposal field constructed at the surface of ground displaying unsuitable percolation capabilities, said disposal field including a multilayer bed of porous fill material and a network of perforated distribution piping positioned in a first layer of said bed of porous fill, said first layer of fill being disposed above a second layer of porous fill, said first layer having particles of a larger size than particles of said second layer, said first and second layers forming said bed; said above ground disposal field receiving periodically said aerobically treated wastewater from said tank assembly and dispersing and disposing of said wastewater by evaporation and evapotranspiration whereby said wastewater disposal may be completed independently of said soil upon which said disposal field is constructed.**]**

B1 3,934,652 (497th)

APPARATUS AND METHOD FOR CEMENTING WELL LINERS

Chudleigh B. Cochran, Houston, Tex., assignor to Hughes Tool Co.

Reexamination Request Nos. 90/000,498, Feb. 6, 1984 and 90/000,657, Oct. 29, 1984.
Reexamination Certificate for Patent No. 3,934,652, issued Jan. 27, 1976, Ser. No. 514,624, Oct. 15, 1974.
Int. Cl.[4] E21B *33/14, 43/10, 23/00*
U.S. Cl. 166—285

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 7 was previously cancelled.

Claims 1–6, 8, 9, and 12–18 are cancelled.

Claim 10 is determined to be patentable as amended.

Claim 11, dependent on an amended claim, is determined to be patentable.

10. [Apparatus as set forth in claim 8 in which said latch means comprises:**]** *Apparatus for cementing a liner in a well bore comprising:*

a. a setting tool having a tubular mandrel connected in a pipe string for extension through said liner creating an annular space therebetween;

b. connector means carried by said setting tool for releasably connecting said liner thereto;

c. wiper means releasably disposed within said liner near one end of said mandrel and having a central opening through which cement may be pumped into said liner through said pipe string and mandrel;

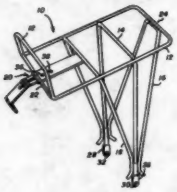
d. plug means adapted for sliding and sealing engagement with the interior of said pipestring and mandrel affecting a movable seal behind said cement as it is pumped into said liner, said plug means being engageable with said wiper means and movable therewith, upon release of said wiper means, to effect a movable seal behind said cement as said cement is displaced from said liner into said surrounding well bore;

e. seal means disposed in said annular space and comprising a first sleeve carrying a first annular seal for sealingly engaging the interior of said liner and a second sleeve carrying a second annular seal for sealingly engaging the exterior of said mandrel;

f. latch means releasably connecting said seal means to said liner permitting limited axial movement of said mandrel without disturbing the axial position of said seal means, said latch means comprising a plurality of latches carried by said first sleeve for movement from extended positions, engaging corresponding surfaces carried by said liner, to retracted positions not engaging said corresponding liner

surfaces, said latches being held in said extended positions by the exterior of said second sleeve preventing axial movement of said seal means relative to said liner.

B1 4,154,382 (498th)
BICYCLE RACK
James R. Blackburn, 2071 Rosewood Dr., San Jose, Calif. 95124
Reexamination Request No. 90/000,206, May 27, 1982.
Reexamination Certificate for Patent No. 4,154,382, issued May 15, 1979, Ser. No. 890,298, Mar. 27, 1978.
Int. Cl.[4] B62J *7/04*
U.S. Cl. 224—39



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is cancelled.

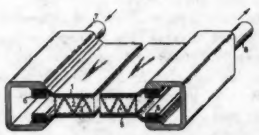
Claims 2, 3, 6 and 7 are determined to be patentable as amended.

Claims 4 and 5 dependent on an amended claim, are determined to be patentable.

New claims 8–10 are added and determined to be patentable.

[1. A bicycle rack comprising:
an elongated substantially horizontal article support frame means having an upper side, a lower side, a forward end and a rearward end, said frame means being symmetrical about a longitudinal axis extending between its ends;
a substantially U-shaped main strut having a base portion and two substantially parallel leg portions depending therefrom;
means rigidly attaching the base portion of said main strut to said frame means at points separated from said rearward end by approximately one-third the length of said frame means such that the two leg portions of the main strut extend downwardly from the lower side of said frame means;
a substantially U-shaped stiffening strut having a base portion and two substantially parallel leg portions depending therefrom;
means rigidly attaching the base portion of said stiffening strut to said frame means at points separated from said forward end by approximately one-third the length of said frame means such that the two leg portions of the stiffening strut extend downwardly from the lower side of said frame means, the end sections of said leg portions of said stiffening strut being rigidly attached to respective end sections of the leg portions of said main strut;
a substantially V-shaped lateral bracing strut, having a base portion and two diverging leg portions, where the base portion of said V-shaped strut is shorter than the base portions of either said main strut or said stiffening strut;
means rigidly attaching the base portion of said lateral bracing strut to said rearward end of said frame means so that it is symmetrical about said longitudinal axis and so that the two leg portions of the lateral bracing strut extend downwardly and laterally outwardly from the lower side of said frame means, the end sections of the leg portions of said lateral bracing strut being rigidly attached to respective end sections of the leg portions of the main strut;
connecting bracket means attached to said forward end of said support frame means and to the base portion of said stiffening strut for connecting said frame means to a first part of a bicycle; and
means for attaching the ends of the leg portions of said main strut to respective second and third parts of said bicycle,
whereby the angled legs of the lateral bracing strut inhibit the rotation of the frame means about said longitudinal axis as caused by unevenly balanced loads disposed on said frame means, and the attachment of all three struts together at their ends creates a strong, rigid triangular strut design that minimizes bending moments in the leg portions of the struts as caused by the weight of the load disposed on said frame means, and wherein the terminal ends of the leg portions of said lateral bracing and said stiffening struts are flared away from the end sections of said main strut such that a strap or rope for securing a load to the rack may be looped or tied around the flared end portion.]

B1 4,230,175 (499th)
HEAT EXCHANGER ELEMENT
Dieter Disselbeck, Bad Soden am Taunus; Eduard Hilscher, Idstein, and Klaus Speler, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany
Reexamination Request No. 90/000,257, Sep. 16, 1982.
Reexamination Certificate for Patent No. 4,230,175, issued Oct. 28, 1980, Ser. No. 877,285, Feb. 13, 1978.
Claims priority, application Fed. Rep. of Germany, Feb. 15, 1977, 2704454; Apr. 2, 1977, 2714901
Int. Cl.[4] F28F *3/12*
U.S. Cl. 165—46



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–7 are cancelled.

[1. A heat exchanger element comprising a flexible face fabric coated on one side with an impervious material, a flexible back fabric coated on one side with a liquid impervious material spaced from said face fabric with the uncoated sides thereof facing each other; a binder of flexible material positioned between and secured to the uncoated sides of said face and back fabrics; said face and back fabrics being formed of textile fabrics and said binder material being formed of binder filaments positioned between and secured to the uncoated sides of said textile fabrics to maintain said textile fabrics in spaced relation to each other; a feeder duct and a discharge duct for heat exchange medium communicating with the space between said face and back fabrics whereby said heat exchange medium is adapted to flow between said coated fabrics between said binder filaments.]

B1 4,302,162 (500th)

WATER PUMPING DEVICE

Jefferson J. Springston, Pasadena, Md., assignor to Lipman Electric Company, Inc., Owings Mills, Md.

Reexamination Request No. 90/000,543, Apr. 17, 1984.
Reexamination Certificate for Patent No. 4,302,162, issued Nov. 24, 1981, Ser. No. 197,064, Oct. 15, 1980.
Continuation of Ser. No. 944,978, Sep. 22, 1978, Pat. No. 4,247,261.
The portion of the term of this patent subsequent to Jan. 27, 1998, has been disclaimed.
Int. Cl.[4] F04B *17/06*
U.S. Cl. 417—424

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-4 are cancelled.

[1. A device adapted to be submerged in a body of water or to rest on the bottom thereof for protecting boats and docks from ice by generating a column of water from the lower depths of said body of water and directing said column upwardly to the surface thereof which may be suspended from the boat or dock to be protected comprising:

a hollow, elongated, circular in cross-section housing the upper portion thereof forming an upwardly directed outlet opening for expelling and directing a column of water upwardly, said opening being contained in a plane disposed normal to the longitudinal axis of said housing, and inlet means carried by said housing in the lower portion thereof for admitting water to the interior thereof;

adjustable suspension means for selectively suspending said housing, submerged in the body of water whereby the longitudinal axis thereof is disposed at a predetermined angle to the vertical with the outlet directed upwardly; said means comprising a pair of suspension lines; connecting means carried by said device for connecting an end of each of said lines to the upper portion of said housing adjacent the outlet in a mutually spaced relationship at the periphery of the outlet whereby the opposite end of each line may be secured to a boat or dock to suspend said housing in a predetermined position in the body of water;

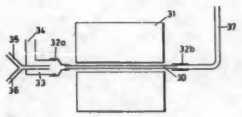
means mounted within the housing between the inlet means and the outlet for drawing water into the housing and for expelling water in a column through the outlet comprising an electric motor and means for selectively coupling said motor to a source of electrical energy and a propeller coupled to and driven by said motor whereby rotation of said propeller will draw water into said housing and expell the water from the housing through the outlet.]

B1 4,341,441 (501st)

METHOD OF MAKING SOLID PREFORMS AND OPTICAL FIBERS DRAWN THEREFROM

Paul E. Lighty, Lafayette, N.J.; Philip W. Black, Mountfitchet, and John Irven, Bishop Stortford, both of England, assignors to International Standard Electric Corp., New York, N.Y.

Reexamination Request No. 90/000,789, May 28, 1985.
Reexamination Certificate for Patent No. 4,341,441, issued Jul. 27, 1982, Ser. No. 761,746, Jan. 24, 1977.
Continuation of Ser. No. 497,990, Aug. 16, 1974, abandoned.
Claims priority, application United Kingdom, Aug. 21, 1973, 39444/73
Int. Cl.[4] C03B *37/025, 37/075*
U.S. Cl. 350—96.30



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-11 is confirmed.

New claims 12-26 are added and determined to be patentable.

1. A method of making an optical fiber preform suitable for drawing into an optical fiber including the steps of:

providing a hollow glass tube of a first refractive index and having a predetermined length with a bore formed therethrough;

introducing into said bore, in unreacted dry vapor form, material that forms a glass layer,

coating said bore by thermally depositing said material thereon to form a glass layer of higher refractive index than the refractive index of said tube;

rotating said glass tube about its longitudinal axis by a rotating device; and

heating said coated tube to collapse said tube into a solid preform having substantially the same length as said predetermined layer whereby the glass coating layer becomes a core of said higher index of refraction than the refractive index of said tube.

STATUTORY INVENTION REGISTRATIONS

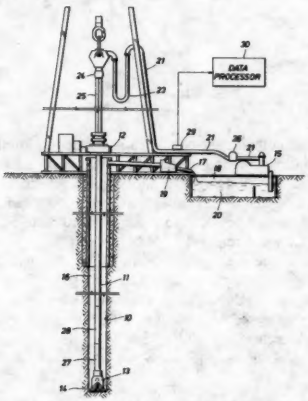
PUBLISHED MAY 6, 1986

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H55
METHOD FOR IMPROVED MUD PULSE TELEMETRY

Mark S. Ramsey, 23439 Cranberry Trail, Spring, Tex. 77373, and Larry A. Watkins, 2023 Wilcrest, Houston, Tex. 77042

Filed Jun. 18, 1984, Ser. No. 621,976
Int. Cl.[4] E21B *47/00*
U.S. Cl. 73—155 **14 Claims**



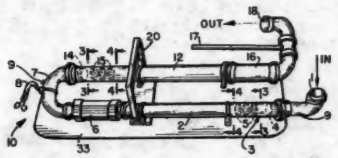
10. An improved method for obtaining information from a wellbore as it is being drilled, said wellbore containing a drill string through which drilling mud is flowing, said drilling mud being pumped into said drilling through a mud flow line, said drill string having a plurality of instruments positioned proximate to the lower portions thereof, said instruments being capable of making measurements of downhole conditions and of creating signals indicative of said measurements, said drill string further having a mud pulser which is adapted to receive said signals from said instruments and to generate mud pulse signals indicative of said measurements, wherein the improvement comprises measuring the flow rate of said drilling mud proximate to the surface to receive said mud pulse signals.

H56
FLOW MEASUREMENT DEVICE

Thomas C. Chandler; Howard C. Heimberger, and Thomas C. Patten, all of Florissant, Mo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 17, 1984, Ser. No. 661,834
Int. Cl.[4] G01F *15/18, 15/00*
U.S. Cl. 73—195 **33 Claims**

1. A flow measurement device comprising in combination:
a flow path,
a mass flow transmitter disposed in said flow path, and
means for altering a pattern of fluid flow in a section of said flow path immediately preceding said transmitter,

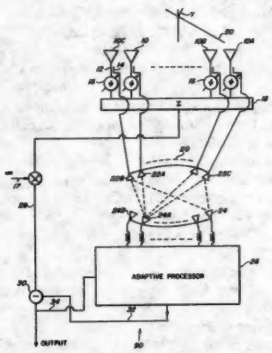


whereby fluid entering said transmitter is substantially constant in flow rate and uniform in character to provide accurate flow measurement.

H57
PARTIALLY ADAPTIVE ARRAY USING BOOTLACE LENS

William F. Gabriel, Annandale, and James K. Hsiao, Vienna, both of Va., assignors to The Government of the United States, Washington, D.C.

Filed Oct. 11, 1985, Ser. No. 786,569
Int. Cl.[4] H01Q *3/34*
U.S. Cl. 343—376 **4 Claims**



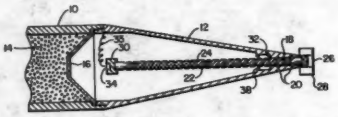
1. A partially adaptive array of antenna which compensates for jamming comprising:
more than 1000 elements of antenna, said elements receiving radio frequency energy and producing a linear output proportional thereto, said elements together forming a plane;
means for forming a main beam from the output of said elements;
a bootlace lens having a plurality of predetermined input positions with each of said elements connected to said bootlace lens at a predetermined position so the output from each element is supplied to said bootlace lens to form a family of beams;
an adaptive processor connected to said bootlace lens to receive said family of beams for determining whether one or more beams from said family of beams contains jamming radiation;
subtractor means connected to the main beam and the adapt-

ive processor and receiving said jamming radiation containing beams and subtracting them from said main beam to remove the effects of jamming.

H58
ARMOR PENETRATION PROJECTILE

Wayne W. Smith, Rockaway, and John F. Hedderich, III, Lake Hopatcong, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 23, 1985, Ser. No. 737,375
Int. Cl.[4] F42B *11/22*
U.S. Cl. 102—476 **9 Claims**



1. A projectile including a shaped explosive charge within a casing, a nose cone attached to one end of the casing and means for extending the part of the nose cone remote from said casing even further from said shaped charge when said projectile is in flight.

H59
PROCESS FOR CONVERTING MAGNESIUM FLUORIDE TO CALCIUM FLUORIDE

Alvin B. Kreuzmann, Cincinnati, and Deborah A. Palmer, Mason, both of Ohio, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 21, 1984, Ser. No. 685,100
Int. Cl.[4] C01F *11/22, 5/28, 1/00*
U.S. Cl. 423—490 **2 Claims**

1. A process for the conversion of MgF_2 to CaF_2 comprising:

mixing MgF_2 with a stoichiometric amount or slight excess of a calcium-containing compound selected from the group CaO, $Ca(OH)_2$, and $CaCO_3$;

heating said mixture to 1,600° F. or higher for two hours or longer to convert said magnesium fluoride and said calcium-containing compound to CaF_2 and by-products;

leaching said CaF_2 and said by-products with an acid solution of sufficient concentration to dissolve said by-products;

removing said acid and by-product solution from said CaF_2 resulting in wet CaF_2 that contains approximately 50% water; and

drying said wet CaF_2 to produce CaF_2.

2. The process of claim 1 wherein said acid is selected from the group HNO_3, HCl, H_2SO_4 and all organic acids.

H60
LONG-LIFE TRIGGERED SPARK GAP

Jackie N. Elkins, West Suffield, Conn.; Steve Friedman, Dorchester, and David Turnquist, Winchester, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 8, 1983, Ser. No. 502,420
Int. Cl.[4] H01J *17/30, 17/46, 61/54*
U.S. Cl. 313—595 **1 Claim**

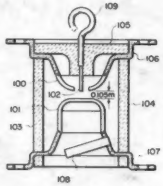
1. A triggered spark gap for pulsed CO_2 laser power conditioners comprising:

a gas-tight housing;

a pair of cap-shaped electrodes disposed within said housing at opposite ends thereof and spaced apart a distance no greater than 0.105 ± 0.005 inches, said electrodes being fabricated of copper infiltrated tungsten material and being adapted to be coupled across a voltage to be switched, one of said electrodes at one end of said housing having an electrode opening therein;

an elongated trigger electrode having one end thereof forming an electrode tip and the other end thereof adapted to be coupled to a source of trigger voltage;

trigger electrode support means fabricated of an electrical insulating material for supporting said trigger electrode with said electrode tip thereof substantially at the center of said electrode opening so that a space is defined between said electrode tip and said electrode opening, said



trigger electrode support means being mounted on said one housing end and extending only a part of the distance between said housing end and said one electrode so that no part of said trigger electrode support means projects into said space between said trigger electrode tip and said electrode opening; and

a mixture of gases in said housing filling the space between said cup-shaped electrodes and said space between said trigger electrode tip and said electrode opening, said mixture of gases consisting of 69% nitrogen, 1% oxygen and 30% xenon.

H61
SELF SUPPORTING CARTRIDGE AND WEAPON SYSTEM THEREFOR

Ladd Yuhash, deceased, late of Bud Lake, N.J., by Salvatore Spignese, administrator, Lexington, Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 31, 1985, Ser. No. 739,803
Int. Cl.[4] F41C *7/00*
U.S. Cl. 42—39.5 **8 Claims**

1. A self supporting cartridge comprising a hollow cylinder which is wound from fiberglass filaments which are bonded together with resin, a conventional primer mounted in the aft end of said cylinder and a projectile mounted in the forward end thereof, said projectile recessed flush with the forward end of said cylinder, said hollow cylinder being designed to withstand the pressures of firing without being confined to a conventional chamber.

H62
CLOSED LOOP BINARY DIGITAL COMMUNICATION SYSTEM

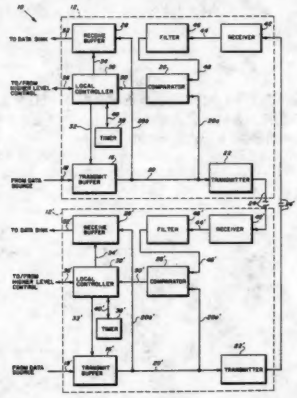
Barry D. Sanderson, Indianapolis, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 25, 1984, Ser. No. 614,196
Int. Cl.[4] H04B *15/00, 1/10*
U.S. Cl. 375—58 **2 Claims**

1. Apparatus for interference resistant communication between a data source and a data sink of binary digital data

messages where a message is made up of a train of discrete message elements where each message element consists of a binary one, or a binary zero, or a space, said apparatus comprising:

a first station and a second station interconnected by a transmission medium, said stations being in the relation of data source and data sink, each of said stations comprising transmitter means for transmitting first, second, and third signal states which are assigned to represent message elements including binary ones, binary zeros, and spaces therebetween, transmit buffer means for holding data to be transmitted, receiver means for receiving message elements transmitted by the other sation, timer means for limiting the amount of time that will be used in attempting



to transfer a message, comparator means for comparing transmitted and received message elements, filter means for enhancing those characteristics of the received signal which are not used for communication to which the receiver is sensitive, receive buffer means for holding message elements received and compared, and local controller means responsive to said timer means and to said comparator means to effect transfer of positively compared elements to said receive buffer and succeeding elements from said transmit buffer to said transmitter means;

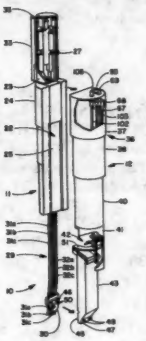
said first and second stations being operative in response to said timer means to reverse roles as data source and data sink when a predetermined time period is exceeded without completion of a message transfer.

H63
POSITIONING APPARATUS

Max A. Vogel, Kennewick, and Paul Alter, Richland, both of Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 7, 1983, Ser. No. 511,702
Int. Cl.[4] G01N *21/00*
U.S. Cl. 250—491.1 **9 Claims**

1. An apparatus for precisely adjusting the position of an article relative to a beam emerging from a housing comprising: a frame, a base plate mounted on said frame for movement relative thereto, a support, means pivotably mounting said support adjacent one end thereof on said base plate, an article holder detachably mounted on the other end of said pivotable support, said support being freely suspended from said base plate and normally biased by gravity toward said housing for urging said holder in a first direction substantially parallel to said beam against said housing, means on said frame for shifting said base plate to effect movement of said holder in a second direction perpendicular to said beam axis, and means on said frame for pivoting said base plate to effect movement of said

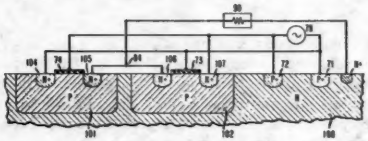


holder in a third direction substantially normal to said first and second directions.

H64
FULL-WAVE RECTIFIER FOR CMOS IC CHIP

Hanafy E. Maleis, New Providence, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 8, 1983, Ser. No. 521,059
Int. Cl.[4] H01L *27/02*
U.S. Cl. 357—42 **2 Claims**



1. A monolithic rectifier including:

an AC input for accepting an AC source,

an output for accepting a DC load,

a full-wave rectifier embodied in a complementary metal-oxide semiconductor chip and including a first path segment including a first transistor and a first diode and a second path segment including a second transistor and a second diode, the first and second path segments being connected into a full-wave rectifier circuit, coupling the AC input to the output,

the first and second transistors including first and second gate electrodes, respectively, the first and second gate electrodes being connected to the first and second path segments, respectively, such that current of a polarity to activate one of the first and second diodes is operative to activate the gate electrode of one of the first and second transistors connected in the same path segment, in a manner to allow current to flow in one of the first and second path segments whereby the first and second path segments are enabled alternately to complete a circuit path between the input and output means;

the complementary metal-oxide semiconductor chip comprising:

an N-type substrate which is electrically floating, and first and second P^+-type surface regions for defining the first and second diodes included in the first and second path segments, respectively, and first and second P-tubs in the substrate, each P-tub including first and second N^+-type surface regions, each P-tub with its first and second N^+-type surface regions defining one of the first and second

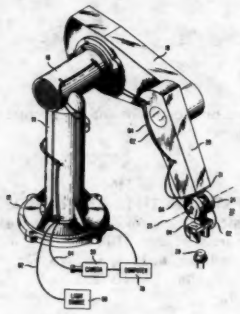
transistors, and the output being simultaneously connected to the first N+-type surface region of the first and second P-tubs and to an independent N+-type surface region in the N-substrate.

H65

DYNAMIC OPTICAL SENSING: ROBOTIC SYSTEM AND MANUFACTURING METHOD UTILIZING SAME

Gerard Beni, Old Bridge, N.J.; Susan Hackwood, Freehold; Lawrence A. Hornak, Ocean, and Janet L. Jackel, Holmdel, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 27, 1983, Ser. No. 498,881
Int. Cl.[4] B66C *1/00*
U.S. Cl. 414—730 17 Claims



1. A robotic system comprising

a robot having a hand which includes movable fingers for inspecting and/or handling an object, an array of optical emitters on one of said fingers and an array of optical receptors on another of said fingers, said arrays capable of being in optical communication with one another,

said array of optical emitters including at least one linear set of emitter devices for generating collimated optical beams,

means for causing said hand to position said object between said fingers and for moving said hand so that said array of emitters scans said object, thereby generating an image of said object from said array of receptors, and

means responsive to said image for controlling the position of said hand.

H66

PULSED PLASMA GENERATION OF EXTREME ULTRAVIOLET RADIATION

Jonathan C. White, Lincroft, N.J., assignor to AT&T Bell Laboratories

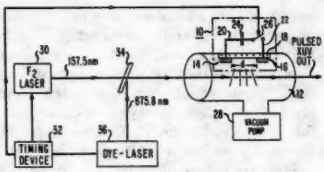
Filed Dec. 21, 1983, Ser. No. 563,816
Int. Cl.[4] H01J *3/30*
U.S. Cl. 372—5 9 Claims

1. A system for generating extreme ultraviolet (XUV) radiation comprising

a metal medium including a ground state, a first ionized state, and at least one high energy level state which will emit XUV radiation;

means for ionizing said metal medium so as to move at least a portion of said medium from said ground state to said first ionized state; and

a pulsed UV radiation source capable of providing continuous pulses of UV radiation wherein the ionized metal medium is exposed to the continuously pulsed UV radiation and absorbs a multiplicity of the continuous pulses, said multiplicity of pulses being sufficient to move said



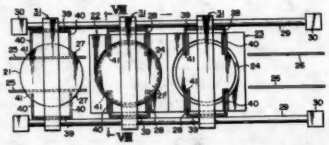
ionized metal medium to said at least one high energy level state for emitting XUV radiation.

H67

CONVEYOR MECHANISM FOR THIN PLATE

Noriaki Mori, Hikone, Japan, assignor to Dainippon Screen Seizo Kabushiki Kaisha, Kyoto, Japan

Filed Apr. 4, 1984, Ser. No. 596,560
Int. Cl.[4] B65G *25/00*
U.S. Cl. 198—775 1 Claim



1. A conveyor mechanism for a thin plate, comprising:

a table defining at least four grooves in the upper surface thereof, two of said grooves extending substantially perpendicular to the direction of conveyance of the thin plate from one side of the table to peripheral parts of an area on which the thin plate is to be mounted, the remaining two of said grooves extending substantially perpendicular to the direction of conveyance of the thin plate from the other side of the table to peripheral parts of the area;

a frame surrounding both sides of the table and movable along both sides of the table; and

at least four fingers movable up and down with respect to the frame and equipped at the inner ends thereof with upward projections which are adapted to support the thin plate, two of said fingers being located in the vicinity of one of the sides of the table and the remaining two of said fingers being located in the vicinity of the other side of the table so that the fingers may move downwardly into corresponding grooves and outwardly from their respective sides of the table so as to permit the thin plate to be mounted on the table and thereafter, the fingers moved inwardly into their corresponding grooves and upwardly so as to lift the thin plate from the table.

H68

ENVIRONMENTALLY ENERGIZED ARM-FIRE DEVICE ACTUATOR

John H. France, Ogden, Utah, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 16, 1985, Ser. No. 767,469
Int. Cl.[4] F42C *5/00*
U.S. Cl. 102—224 10 Claims

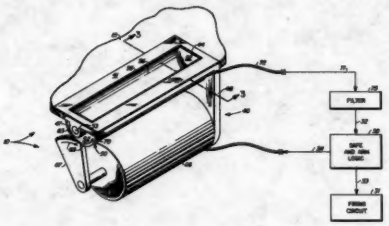
1. In combination,

a missile having a skin and moveable through the air so as to induce air flow in a boundary layer along the skin;

a safe and arm device mounted in the missile and receptive to an electrical signal;

a transducer for generating such a signal when subjected to air pressure oscillations, and a fluid oscillator apparatus comprising:

means, which define a cavity adjacent to said skin and define a slit opening from the cavity through the skin



into the boundary layer, for generating air pressure oscillation in said cavity due to air flow in said boundary layer past the slit; and

means for mounting the transducer in juxtapositioned relation to said cavity for reception of said oscillations so that such a signal is generated by the transducer when said oscillations occur.

REISSUES

MAY 6, 1986

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,133

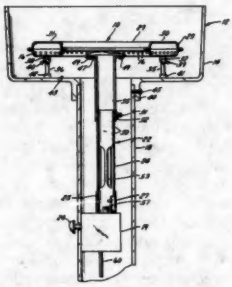
ADJUSTABLE VENTURI TUBE ASSEMBLY FOR A GAS BARBECUE GRILL

Walter Koziol, Antioch, Ill., assignor to Modern Home Products Corp., Antioch, Ill.

Original No. 4,373,505, dated Feb. 15, 1983, Ser. No. 239,999, Mar. 3, 1989. Continuation-in-part of Ser. No. 940,215, Sep. 7, 1978, Pat. No. 4,267,816. Application for reissue May 7, 1984, Ser. No. 607,925

Int. Cl.⁴ F24C *3/00*

U.S. Cl. 126—39 E **16 Claims**



14. An improved gas venturi tube assembly for a gas burner element comprising:

a tubular member defining at least one lateral aperture;

an air regulatory member slidably received by said tubular member at one end thereof to controllably cover said lateral aperture;

an opening defined by said tubular member adapted to receive a gas supply nozzle;

a gas intake conduit having an end for operative association with said burner element at one end and in telescoping relationship with said tubular member at the other end; and

means constructed and arranged to limit movement of said gas intake conduit and said tubular member in said telescoping relationship.

Re. 32,134

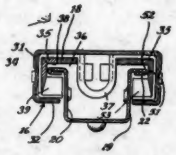
DRAWER SLIDE ASSEMBLY

Kenneth H. Gutner, 3285 Dato, Highland Park, Ill. 60635, and Jay S. Waxman, 9352 Kilbourn, Skokie, Ill. 60076

Original No. 4,305,625, dated Dec. 15, 1981, Ser. No. 190,330, Sep. 24, 1980. Continuation-in-part of Ser. No. 115,946, Jan. 28, 1980, abandoned. Application for reissue Oct. 18, 1983, Ser. No. 543,133

Int. Cl.⁴ F16C *29/04*

U.S. Cl. 308—3.8 **30 Claims**



30. A drawer slide assembly comprising a drawer-equipped article of furniture, an elongated stationary metal guide member secured to the interior of said article and extending rearwardly from the center of a drawer opening in the front of the article and an elongated, metal slide member adapted to be secured to the underside of a drawer, one of the said members being C-shaped and the other being T-shaped with said C-shaped member being arranged in ensleeving relation to said T-shaped member, said article adjacent the front thereof being equipped with plastic element means to facilitate sliding action of said drawer and said slide member being equipped with a plastic adapter element adjacent the rear end thereof in bearing relation with said guide member whereby noise from metal to metal bearing is avoided while simultaneously providing a lubricating effect.

Re. 32,135

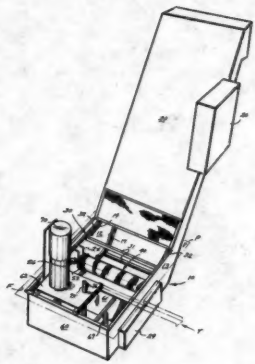
COMPACT UNIVERSAL DRUM FILTER SETTLER

John L. Creps, Rudolph, Ohio; Robert J. Fox, Waukesha, Wis.; Ted W. Guelde, Deshler, Ohio; Eugene H. Harms, Perrysburg, Ohio, and Stephen N. McEwen, Bowling Green, Ohio, assignors to Henry Filters, Inc., Bowling Green, Ohio

Original No. 4,421,645, dated Dec. 20, 1983, Ser. No. 424,427, Sep. 27, 1982. Application for reissue Nov. 14, 1984, Ser. No. 671,427

Int. Cl.⁴ B01D *33/06*

U.S. Cl. 210—260 **28 Claims**



23. In a filtration apparatus, an open-topped dirty liquid tank having parallel, essentially vertical side wall portions; a clean liquid discharge port in one of said wall portions; a rotatable drum positioned between said wall portions and having a perforate periphery accommodating the flow of clean liquid therethrough; a shaft assembly axially of said drum and supporting said drum for rotation; means for enabling removal of said filter drum comprising means supporting said shaft assembly including a ball and socket duct joint at one end of the shaft assembly, means urging said supporting means toward the one side wall portion to retain the drum and shaft assembly in said tank, means including said ball and socket duct joint for accommodating the flow of clean liquid from the interior of said drum to said clean liquid discharge port for flow therethrough, and means carried by said shaft assembly to facilitate installation and removal of said drum and shaft assembly through the top of the tank.

Re. 32,136

ELECTROSTATOGRAPHIC DEVELOPERS COMPRISING TONERS CONTAINING A POLYESTER HAVING P-HYDROXYBENZOIC ACID RECURRING UNITS

M. Akram Sandhu, Rochester; John F. Wright, Penfield, and Michel F. Molaire, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Original No. 4,446,302, dated May 1, 1984, Ser. No. 517,142, Jul. 25, 1983. Division of Ser. No. 398,138, Jul. 14, 1982, Pat. No. 4,416,965. Application for reissue Feb. 11, 1985, Ser. No. 700,848

Int. Cl.[4] C08G *63/16*

U.S. Cl. 528—302 8 Claims

1. A polyester having recurring units derived from [diols and diacids and recurring units derived from p-hydroxybenzoic acid characterized in that from about 15–60 mole percent of the recurring units of said polyesters are derived from p-hydroxybenzoic acid.] *diacids and diols selected from the group consisting of alkylene glycols and monocyclic diols and recurring units derived from p-hydroxybenzoic acid characterized in that from about 15–60 mole percent of the recurring units of said polyesters are derived from p-hydroxybenzoic acid.*

Re. 32,137

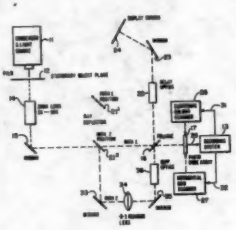
GRAPHICAL REPRESENTATION TRANSDUCING

Thomas A. Lianza, Beverly, Mass., assignor to Eikonix Corporation, Bedford, Mass.

Original No. 4,256,969, dated Mar. 17, 1981, Ser. No. 92,493, Nov. 8, 1979. Continuation-in-part of Ser. No. 960,051, Nov. 13, 1978, abandoned. Application for reissue Nov. 12, 1981, Ser. No. 320,337

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—578 12 Claims



1. Graphical representation transducing apparatus comprising,

means defining an object plane for supporting a fixed object to be imaged in a photoelectric transducing means image plane,

lens means *in fixed relationship to both said object plane and said image plane* comprising means for focussing the image of said object upon said photoelectric transducing means image plane,

photoelectric array transducing means in said photoelectric transducing means image plane for providing an electrical signal representative of the light intensity thereon,

and means for mechanically displacing in *a plane including* said image plane said photoelectric transducing means *relative to said lens means* to scan the image of said object.

Re. 32,138

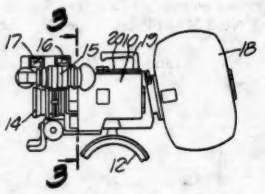
MOTION PICTURE CAMERA

Robert E. Gottschalk, Los Angeles, Calif., assignor to Panavision, Incorporated, Tarzana, Calif.

Original No. 4,082,436, dated Apr. 4, 1978, Ser. No. 710,164, Jul. 30, 1976. Division of Ser. No. 582,698, Jun. 2, 1975, Pat. No. 4,121,886, which is a continuation of Ser. No. 388,630, Aug. 15, 1973, abandoned. Application for reissue Aug. 3, 1979, Ser. No. 63,421

Int. Cl.[4] G03B *23/02*

U.S. Cl. 352—72 6 Claims



1. In a motion picture camera, the combination of: a housing, a camera movement assembly enclosed [with] *within* said housing, a support member within said housing, means for mounting the camera movement assembly on said support member, sound-absorbing connector means securing said support member to said housing, said camera movement assembly being spaced from the enclosing housing and without any contact therewith, the camera housing having an upper portion provided with a first opening and having a rearward portion provided with a second opening, *the openings being duplicates,* means for securing [a] *the same* film magazine *directly to said housing and* selectively over either of said openings whereby a film strip in said magazine may pass through the selected opening to the camera movement assembly, a lens mount fixed on the housing and without contact with said support member, and a closure member for closing either of said openings releasably engaging said housing and closing one of said openings.

Re. 32,139

METHOD AND ARRANGEMENT FOR THE AVOIDANCE OF ERRORS DURING THE REPRODUCTION OF AN IMAGE PATTERN

Heinz Taudt, Kiel, and Uwe Gast, Kiel-Rammsee, both of Fed. Rep. of Germany, assignors to Dr.-Ing. Rudolf Hell GmbH, Kiel, Fed. Rep. of Germany

Original No. 3,975,761, dated Aug. 17, 1976, Ser. No. 559,895, Mar. 19, 1975. Application for reissue Apr. 21, 1983, Ser. No. 487,089

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1974, 2 413 034

Int. Cl.[4] H04N *1/21*

U.S. Cl. 358—78 9 Claims

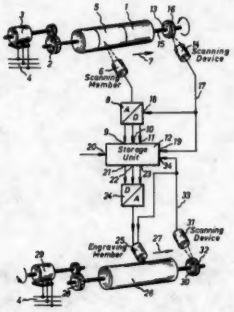
1. In a method for [the] *half-tone* reproduction of an image pattern disposed on a [substantially nonuniformly driven scanning drum,] *scanning drum rotating with a substantial nonuniform first speed,* wherein the image pattern is photo-electrically scanned point-by-point and line-by-line to generate an *analogue* image [pattern] signal [having an analog relationship to the image pattern and the image pattern signal is used to record on at least one recording drum driven substantially nonuniformly and independently of the scanning drum, the improvement comprising:] *and the image signal is used to record on at least one recording drum independently driven from said scanning drum and rotating with a substantial nonuniform second speed independently from said first speed, the improvement comprising:*

generating a scanning timing signal in synchronism with the [rotational movement of said scanning drum;] *nonuniform first speed of the scanning drum;*

converting said [image pattern signal] *analog image signal* to a digital signal in synchronism with said scanning timing signal;

[storing] *writing* said digital signal in a storage unit measure-by-measure in synchronism with said scanning timing signal;

generating a recording timing signal in synchronism with the [rotational movement of said recording drum;] *nonuniform second speed of the recording drum;*



reading out said digital signal from said storage unit measure-by-measure in synchronism with said recording timing signal; [and, thereafter]

generating a first signal from said recording timing signal used to screen the image reproduction on said recording drum, and

driving at least one recording member [with said digital signal to produce an image reproduction on the recording drum.] *by said digital signal read out from the storage unit and by said first signal to produce a half-tone reproduction on said recording drum.*

Re. 32,140

ELECTRONIC ENGINE CONTROL APPARATUS

Hiroastu Tokuda, Katsuta; Shigeki Morinaga, Hitachi, and Hideo Nakamura, Hinodemachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 4,276,601, dated Jun. 30, 1981, Ser. No. 943,930, Sep. 20, 1978. Application for reissue Jun. 30, 1983, Ser. No. 509,769

Claims priority, application Japan, Sep. 21, 1977, 52-114048; Oct. 17, 1977, 52-124261; Oct. 19, 1977, 52-125972; Oct. 19, 1977, 52-125982

Int. Cl.[4] F02D *41/26, 41/30;* **F02P** *5/15;* **G05B** *15/02*

U.S. Cl. 364—431.12 **63 Claims**

24. For use in a processor-controlled apparatus for controlling the operation of an internal combustion engine for which a plurality of sensors produce signals representative of operating conditions of said engine and adapted to be coupled to actuator means for controlling respective energy conversion functions of said engine in response to control signals applied thereto;

an improved control apparatus comprising, in combination:

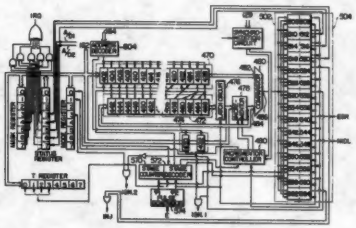
first means, responsive to engine control codes coupled thereto for producing respective engine timing codes the values of which are sequentially modified;

second means, coupled to said first means, for producing respective output signals upon the values of said respective engine timing codes reaching defined limits;

third means, coupled to said second means, for storing said output signals for application to [said] *the* actuator means; and

fourth means, coupled to said first and third means, for causing the values of said respective engine timing codes to be modified in dependence upon the output signals stored by said third means.

54. For use in a processor-controlled apparatus for controlling the operation of an internal combustion engine for which a plurality of sensors produce signals representative of operating conditions



of the engine and being coupled to actuator means which respond to control signals applied thereto for controlling respective energy conversion functions of said engine, an improved control apparatus comprising, in combination:

first means for generating engine control timing signals through which operational events of the engine are controlled;

second means for storing engine control data;

third means for producing sequentially changing engine timing data;

fourth means for comparing respective engine control data stored by said second means with engine timing data produced by said third means in accordance with said engine control timing signals generated by said first means and producing a respective output signal in response to respective engine control data defining a prescribed relationship with respect to engine timing data produced by said third means; and

fifth means for producing a respective control signal to be coupled to an actuator means in response to a respective output signal produced by said fourth means.

PLANT PATENTS

GRANTED MAY 6, 1986

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

5,734

ROSE PLANT JACINAL

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Oct. 1, 1984, Ser. No. 656,921
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—26 1 Claim

1. A new and distinct variety of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of abundant production of medium length stems bearing deep pink buds comparable to R.H.S. Colour Chart Red 51A, opening to lighter pink blooms, of very little fragrance.

5,735

ALSTROEMERIA NAMED ZELIDO

Gerald J. van Zelderen, Aalsmeer, Netherlands, assignor to J. van Zelderen & Zn., Aalsmeer, Netherlands

Filed Sep. 19, 1984, Ser. No. 652,603
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinctive alstroemeria cultivar, substantially as shown and described, characterized by the distinctive coloration and continuous production of its large blossoms with their petals having numerous longitudinal streaks of red-purple against a predominately white background and with the outer petals also having central areas of a lighter red-purple background.

5,736

CHRYSANTHEMUM PLANT NAMED CITRON

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 1, 1984, Ser. No. 636,853
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct plant of *Chrysanthemum morifolium,* Ramat., named Citron, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; daisy capitulum type; light orange ray floret color; diameter across face of capitulum ranging from 5 to 7 cm. at maturity; uniform nine week flowering response; tall plant height when grown single stem; 17 to 23 cm. peduncles on open, normally terminal sprays; rapid development of green discs devoid of pollen; 13° C. minimum temperature tolerance for initiation and development of flowering buds, and a long duration of both leaves and flowers.

5,737

CHRYSANTHEMUM PLANT NAMED THRILL

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 27, 1984, Ser. No. 644,262
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., plant named Thrill, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; daisy capitulum type; orange red ray floret color; diameter across face of capitulum ranging from 3.5 to 4.5 cm. at maturity; uniform seven to eight week flowering response; medium plant height; spreading, branching pattern, and tolerance of both low winter 13° C. minimum and high summer 24° C. night to 38° C. day temperatures for bud initiation and flower development.

5,738

CHRYSANTHEMUM PLANT NAMED RAVE

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 27, 1984, Ser. No. 644,267
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., plant named Rave, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; anemone capitulum type with 3 cm. cushion purple-violet ray floret color; diameter across face of capitulum ranging from 5 to 6 cm. at maturity; uniform seven to eight week flowering response; medium plant height; semi-spreading branching pattern; and tolerance of both low winter 13° C. minimum and high summer 24° C. night to 38° C. day temperatures for bud initiation and flower development.

5,739

CHRYSANTHEMUM PLANT NAMED SUNBEAM

William E. Duffett, Salinas, Calif., and Grace H. Mack, New Canaan, Conn., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Sep. 24, 1984, Ser. No. 653,606
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—78 1 Claim

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., named Sunbeam, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of button capitulum form, formal decorative capitulum type, yellow ray floret color, diameter across face of capitulum up to 2.5 cm., short plant height, semi-spreading branching pattern, average natural season flowering date of September 15, average flowering response period of seven weeks in photoperiodic controlled short day programs, and uniform response with durable color and form in Spring for small pot flowering programs.

5,740

DIEFFENBACHIA CV. MORLOF

Michel P. Morel, and Vincent C. Morel, both of Antibes, France, assignors to Morel et Cie S.N.C., Antibes, France

Filed Mar. 14, 1984, Ser. No. 589,481
Claims priority, application France, Aug. 12, 1983, NR83-13360
Int. Cl.[4] A01H 5/00
U.S. Cl. Plt.—88 1 Claim

1. The new and distinct variety of dieffenbachia substantially as herein shown and described, being particularly characterized in its spindle-shaped leaves, garnished with pale yellow-white variegations; in its displaying a large foliar framework; and in its numerous vegetative shoots due to the non-inhibition of the axillaries in quantities much greater than are usually found in the classic Tropic White variety, thereby resulting in a much greater growth density and in the production of small-size slips.

PATENTS

GRANTED MAY 6, 1986

ERRATA

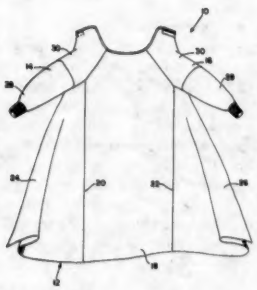
For CLASS	See PATENT NO.
522–005	4,586,995
522–007	4,586,996
525–426	4,586,997
524–405	4,587,033
530–211	4,587,044
530–328	4,587,045
530–330	4,587,046
560–341	4,587,056
560–302	4,587,057
560–347	4,587,058
558–400	4,587,059
558–304	4,587,060
558–133	4,587,062
558–146	4,587,063
522–126	4,587,274
534–606	4,587,292
037–112	4,587,655

PATENTS

GRANTED MAY 6, 1986

GENERAL AND MECHANICAL

4,586,196
DISPOSABLE SURGICAL GOWN
Roger N. White, Memphis, Tenn., assignor to The Kendall Company, Boston, Mass.
Filed Oct. 3, 1984, Ser. No. 657,316
Int. Cl.[4] A41B *9/00*
U.S. Cl. 2—114 **3 Claims**

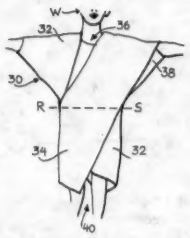


1. A disposable surgical gown comprising:
a torso enveloping portion; and
sleeves affixed to said torso enveloping portions, said sleeves each having an upper portion and a lower portion, said upper portion being vapor permeable and having an air permeability of at least about 300 cubic feet/minute/-square foot, said lower portion being liquid impermeable.

4,586,197
AERODYNAMICALLY STABILIZED MOTORCYCLIST HELMET
Stirling J. Hubbard, 206 Roosevelt St., Lafayette, La. 70501
Filed Jan. 31, 1985, Ser. No. 696,993
Int. Cl.[4] A42B *3/02*
U.S. Cl. 2—410 **2 Claims**

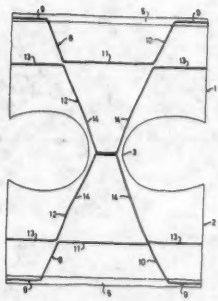
1. On a motorcycle helmet having front and back lower rims, a front downwardly depending face shield and a chin strap, an inverted visor fixed to said lower back rim and extending upwardly and outwardly around the rear of said helmet for inducing counteracting wind pressures to the wind pressures due to forward motion of of a motorcycle and helmet wearer proportional to the amount of forward and backward tilt of wearer's head and helmet according to increase and decrease, respectively, of motorcycle speeds.

4,586,198
GARMENTS EMPLOYING SUPERIMPOSED, DIAGONALLY-ORIENTED PANELS WITH FOLDED-BACK END PORTIONS
Leonore Alaniz, 247 Eighth Ave., San Francisco, Calif. 94118
Filed Mar. 5, 1984, Ser. No. 585,998
Int. Cl.[4] A41D *1/22*
U.S. Cl. 2—105 **19 Claims**



11. A garment with bottom, sleeve, and neck openings and employing diagonally-oriented panels comprising: first and second elongated panels of material, said first and said second panels being superimposed in a face-to-face manner so that their directions of elongation form an angle, each of said panels being defined by upper and lower edges and outer and inner edges, each of said inner edges having a semicircular recess, said panels being mutually oriented and attached so that said recesses combine to form a neck opening which has one continuous curved edge, an upper portion of each of said panels being folded so that the outer edge of said upper portion of each of said panels adjoins a part of said outer edge of said lower portion, whereby a pair of sleeve openings are formed.

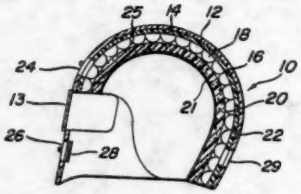
4,586,199
ELASTIC PANTS
Mats G. Birring, Gothenburg, Sweden, assignor to Molnlycke AB, Gothenburg, Sweden
Filed Dec. 21, 1982, Ser. No. 455,033
Int. Cl.[4] A41B *9/00*
U.S. Cl. 2—401 **4 Claims**



1. Elastic pants adapted to hold a diaper in place against the body of a user, the elastic pants being made of an elastic material having a waisted crotch portion joining a front portion of the pants to a rear portion of the pants, the front and rear portions having side edges and waist edges and each having a central portion spaced a substantial distance from said side and

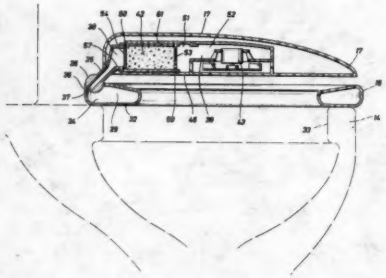
waist edges, and means bordering said central portion and exerting greater pressure toward the body of the user than do the central portions when the pants are in use.

4,586,200
PROTECTIVE CRASH HELMET
Melvyn C. Poon, 130 Vasquez St., San Francisco, Calif. 94127
Filed Mar. 26, 1984, Ser. No. 593,550
Int. Cl.[4] A42B 3/02
U.S. Cl. 2—413 **8 Claims**



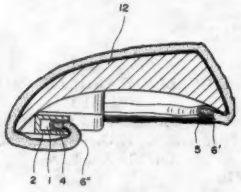
1. A protection crash helmet comprising
a rigid outer protective shell;
a first layer of cushioning material secured to the interior of said protective shell;
a second layer of cushioning material secured to the interior of said first layer wherein said second layer is a sheet containing at least 25 hemispherical shaped air cells with the round portion of said hemispherical shaped air cells directed toward the wearer's head with passageways therebetween;
at least one air inlet provided in the frontal area of said helmet to direct air inside of said helmet;
means for distributing said air inside said helmet wherein said means is by flowing through said passageways between said air cells;
at least one air outlet provided in said helmet to let a portion of said air escape from said helmet, and
a removable porous liner fitted to the interior of said second layer.

4,586,201
TOILET AIR PURIFIER APPARATUS
Ray R. Todd, Jr., 2003 Partridge, Bldg. D, Tyler, Tex. 75701
Filed May 14, 1984, Ser. No. 609,770
Int. Cl.[4] E03D 9/14
U.S. Cl. 4—217 **6 Claims**



1. An improved apparatus for ventilating and purifying unpleasant bathroom odors rising from the bowl of a commode, comprising;
(a) a toilet seat having an air inlet opening into said bowl;
(b) a toilet lid having an internal compartment with an air outlet in an exterior surface, and an air outlet in a rearward edge;
(c) a pair of spaced pintles adapted to be secured to the bowl and providing an independent pivotal mount for said seat and said lid on respective rearward edges;
(d) said seat having an internal passageway extending from said air inlet to an air outlet in its rearward edge located between said pintles and facing rearwardly of said seat;
(e) said lid having a tubular valve member carried in said rearward face and located between said pintles said seat carrying a trough joining a rearward boundry of said air inlet on said seat, and said tubular valve member being received within said trough;
(f) said tubular valve member having a radial opening positioned to align with said air outlet on said seat when the lid is in raised position and said tubular valve member having an imperforate portion sealing said air outlet on said seat when said lid is resting upon said seat; and
(g) said lid having a means for moving air from said valve member to said interal compartment and a means for removing odor from air moving in said compartment between said air inlet and said outlet on said lid,
wherein said axial opening in said tubular valve member is sealed against the rearward wall of said trough when said lid is resting against said seat.

4,586,202
TOILET SEAT COVER
Mitsunobu Uchida, Norcross, Ga., assignor to Kabushiki Gaisha Sanko, Japan
Filed Oct. 2, 1984, Ser. No. 656,871
Int. Cl.[4] A47K 13/14
U.S. Cl. 4—242 **12 Claims**



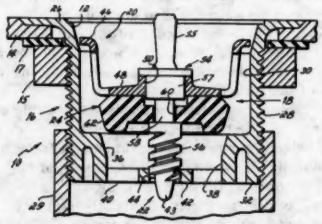
1. A cover assembly for a toilet seat, said seat having an inner periphery, a sitting surface and an underside, said cover assembly comprising:
a cover main body including a short tube of stretchable fabric having open ends, an elastic member provided at the edge of each open end thereof,
a retainer in the form of a ring larger than the inner periphery of the toilet seat and smaller than the outer periphery thereof, said retainer having in its outer peripheral side surface a groove for removable fitting therein the elastic member provided at the edge of one open end of said cover main body, wherein, the thickness of at least one of said elastic members, at its respective edge, being related to the height of said groove, such that upon insertion thereof into said groove the memory of said elastic member will sustain said insertion while the other edge passes over said toilet seat sitting surface for attachment to said underside.

4,586,203

SINK STRAINER ASSEMBLY

James J. Westgerdes, Ft. Recovery, Ohio, assignor to Fort Recovery Industries, Inc., Fort Recovery, Ohio

Filed Oct. 15, 1984, Ser. No. 660,890
Int. Cl.[4] A47K 1/14
U.S. Cl. 4—287 1 Claim



1. A sink strainer assembly comprising:

a strainer body having a lower threaded bore and an interior wall formed with a shoulder seat;

a strainer basket having a bottom wall formed with an axial bore;

a post having a handle top portion, a center portion, and a threaded bottom portion, said threaded bottom portion being adapted to mate with said threaded bore of said strainer body, said center portion of said post extending through said bore in said strainer basket and said threaded bottom portion of said post extending beneath said bottom wall of said strainer basket;

a unitary single-piece resilient stopper having an axial bore which is smaller in diameter than said threaded bottom portion of said post and approximately the same diameter as said center portion of said post, the bore of said stopper being forced over said threaded bottom portion of said post and onto said center portion of said post so as to secure said strainer basket to said post between aid handle top portion and said threaded bottom portion thereof;

said strainer basket, post and stopper being adapted to be inserted within said strainer body so that said threaded bottom portion of said post engages said threaded bore of said strainer body, said post being rotatable in one direction to lower said strainer basket and urge said stopper against said shoulder seat of said strainer body forming a seal therebetween, said post being rotatable in the opposite direction to raise said strainer basket and lift said stopper from said shoulder of said strainer body for breaking said seal,

said center portion of said post including a section of reduced diameter formed in said post above said threaded bottom portion and beneath said strainer basket, said stopper being seated over said section of reduced diameter in engagement with said bottom wall of said strainer basket, said stopper thereby mounting said strainer basket to said post,

said reduced diameter section of said center portion of said post being smaller in cross section than said top portion and said threaded bottom portion of said post, and

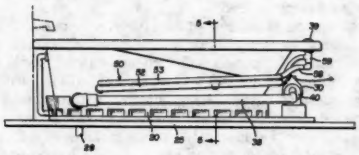
said post and strainer basket being assembled by insertion of said threaded bottom portion and said center portion through said central bore of said strainer basket so that said top portion of said post extends atop said bottom wall of said strainer basket and said center portion of said post extends beneath said bottom wall of said strainer basket, said threaded bottom portion of said post thereafter being inserted through said central bore of said stopper, said stopper seating within said center portion of said post and contacting the underside of said bottom wall of said strainer basket, said bottom wall of said strainer basket being captured between said top section of said post and said stopper whereby said strainer basket, post and stopper are releasably connected together as a unit.

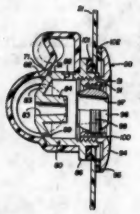
4,586,204

RECIRCULATING BATHTUB

Phillip D. Daniels, 4797 Lake Bluff, West Bloomfield Township, Oakland County, Mich. 38033

Filed Sep. 24, 1984, Ser. No. 653,595
Int. Cl.[4] A61H 33/02
U.S. Cl. 4—542 13 Claims





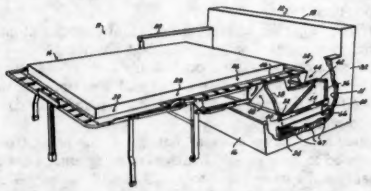
1. Apparatus for supplying water and air to a plurality of spaced discharge locations in a recirculating bathtub, comprising a unitary, molded manifolded having vertically spaced water and air conduits joined by an integral joining portion, said conducts being of a length sufficient to bridge at least two of said discharge locations, said manifold having integral bulbous enlargements spaced at the spacing of said discharge locations and opening onto the water conduit, and said air conduit communicating with said bulbous enlargements through openings formed in said integral joining portion during the molding of said manifold.

4,586,205

SOFA-SLEEPER HAVING A REMOVABLE SOFA BED MECHANISM

John E. Stevens, Carthage, Mo., assignor to Leggett & Platt, Incorporated, Carthage, Mich.

Filed Aug. 9, 1984, Ser. No. 639,105
Int. Cl.[4] A47C 17/04, 17/00
U.S. Cl. 5—13 5 Claims



1. A sofa-sleeper comprising

a stationary sofa frame having front, back and opposed sidewalls,

a sofa bed mechanism having pivotally interconnected body, intermediate and foot frame sections, said frame sections of said sofa bed mechanism being extendable to form a bed and foldable within said sofa frame to form a seat,

an elongated sofa bed mechanism supporting bracket mounted on the interior surface of each of said opposed sidewalls of said sofa frame, each of said brackets including top and bottom edges and opposite ends, said opposite ends of each of said elongated brackets being located adjacent the front and back of said sofa frame, each of said elongated brackets being formed as a single dove-tail shaped slideway having inwardly sloping surfaces at each of said opposite ends,

an elongated mounting plate pivotally connected to said head and body frame sections of said sofa bed mechanism on each side of said sofa bed mechanism, each of said mounting plates having opposed ends with inwardly sloping surfaces adapted to be inserted within said dove-tail shaped slideways of said brackets of said sofa frame engaged with said inwardly sloping surfaces of said bracket for removably mounting said sofa bed mechanism upon said sofa frame.

4,586,206

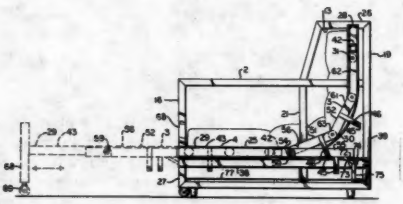
CONVERTIBLE SOFA-BED ARRANGEMENT

Morris Singer, 6257 State Ave., Kansas City, Kans. 66102

Filed Jul. 23, 1980, Ser. No. 171,332

Int. Cl.[4] A47C *17/06*

U.S. Cl. 5—18 R **1 Claim**



1. A convertible sofa-bed arrangement comprising:

(a) a main mounting sofa frame having an upright backrest with a traversely elongated cavity therein and having opposite ends;

(b) track members mounted at said opposite ends of said sofa frame, each track member having a front portion extending generally horizontally and a rear portion curving upwardly from said front portion and into said cavity;

(c) a mattress supporting frame slidably connected at opposite sides thereof to said track members, said mattress frame assuming a bed position upon being fully extended along said track members toward said front portions thereof and assuming a sofa position upon being fully retracted along said track member toward said rear portions thereof, said mattress frame having a front end adjacent said front portions of said track members in said sofa position;

(d) floor engaging casters on said front end of said mattress frame to support same in said bed position;

(e) a mattress positioned on said mattress frame, said mattress having a head end, a foot end, and opposite sides;

(f) said mattress being a substantially standard full size sofa-bed mattress;

(g) said sofa frame and said mattress frame being sized and shaped to receive said mattress in an orientation wherein said head end and said foot end of said mattress are positioned respectively adjacent said opposite sides of said mattress frame and such that side portion of said mattress is received in said cavity in said sofa position;

(h) reversible motor means positioned on said sofa frame, operatively connected to said mattress frame, and operable to translate said mattress frame with said mattress thereon substantially completely between said bed position and said sofa position;

(i) said motor means includes a rotary shaft;

(j) a sheave is positioned on said shaft;

(k) pulley means are mounted on said sofa frame;

(l) cable means engages said sheave and said pulley means and is connected to said mattress frame whereby rotation of said shaft is operative to effect translation of said mattress frame between said bed and sofa positions;

(m) said sofa frame has a front portion and a rear portion;

(n) said pulley means includes a first pulley and a second pulley mounted respectively at said front and rear portions of said sofa frame;

(o) said cable means includes a cable, said cable extending between said first and second pulleys;

(p) said cable is connected to said mattress frame at a point on said cable between said first and second pulleys;

(q) said motor means is an electric motor;

(r) safety switch means is electrically connected to said motor and mechanically connected to said cable and is operative to stop the operation of said motor in response to a selected increase in the tension of said cable;

(s) said safety switch means includes a pair of spaced apart rollers mounted on said sofa frame and having said cable engaged therewith;

(t) a lever arm pivotally mounted on said sofa frame, said arm having a sensing roller at one end thereof, said sensing roller engaging said cable at a position between said pair of rollers;

(u) spring means connected to said arm at an end opposite said sensing roller and connected to said sofa frame, said spring means biasing said sensing roller into engagement with said cable against the tension of said cable;

(v) a switch contact member on said lever arm at a position spaced from the pivotal connection of said arm to said sofa frame; and

(w) a switch positioned on said sofa frame and including a switch operator for contact by said switch contact member upon the tension of said cable exceeding the force of said spring, said switch being connected to said motor and operative to stop the operation thereof upon contact of said switch operator by said switch contact member.

4,586,207

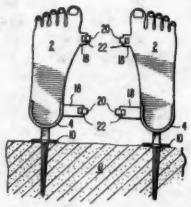
SUNBATHING LEG RISER

Clint G. Cornette, #312 34 Ave., Cherry Grove, North Myrtle Beach, S.C. 29576

Filed Nov. 15, 1984, Ser. No. 671,890

Int. Cl.[4] A47C *20/08*

U.S. Cl. 5—444 **4 Claims**



1. A leg riser for use while sunbathing, comprising:

a. a platform against which a user's foot is placed;

b. a heel rest connected to said platform into which a heel of said user is placed;

c. a stake connected to said heel rest for inserting said leg riser into a portion of earth; and

d. a multiplicity of locking devices connected to said leg

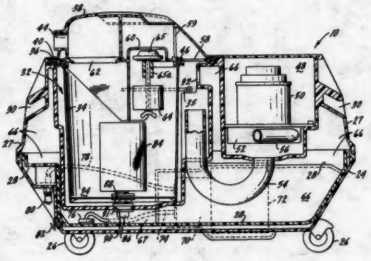
riser which allow a first of said leg risers to be connected to a second of said leg risers for transportation and storage of said leg risers in pairs, with each of said locking devices comprising a male insert and a female receptacle, with the male insert of one of said leg risers being inserted into the corresponding receptacle of said second leg riser.

4,586,208

FLOOR MAINTENANCE MACHINE AND METHOD

Donald S. Trevarthen, Golden Valley, Minn., assignor to Tennant Company, Minneapolis, Minn.

Filed Dec. 17, 1984, Ser. No. 682,612
Int. Cl.[4] A47L *11/30*
U.S. Cl. 8—158 **12 Claims**



1. A method of operating a floor maintenance machine having a solution chamber for holding clean solution to be supplied to a floor to be cleaned, a recovery chamber for receiving dirty solution returned from the floor, two conduits and a cleaning head connected to the chambers for supplying clean solution from the solution chamber to the floor to be cleaned and for returning dirty solution to the recovery chamber, a pump for supplying clean solution from the solution chamber to the cleaning head, and a vacuum fan for creating a vacuum in the recovery chamber so that dirty solution will be drawn from the floor through the cleaning head, including the steps of establishing communication between the chambers, both above and below the normal solution level, so that solution may flow from the recovery chamber through the below communication into the solution chamber and the vacuum in the recovery chamber will be applied through the above communication to the top of the solution in the solution chamber, cleaning the dirty solution flowing through the below communication so that the dirty solution in tne recovery chamber will be cleaned before it is returned to the solution chamber to thereby operate the machine on a recycling basis, and closing both the above and below communications so that the machine may also be operated on a non-recycling basis.

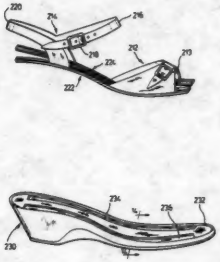
4,586,209

METHOD OF MAKING FOOTWEAR

Douglas W. Bensley, 100-1385 Commissioners Rd. West, London, Ontario N6K 1E2, Canada

Continuation-in-part of Ser. No. 148,611, May 12, 1980, Pat. No. 4,343,057, which is a continuation-in-part of Ser. No. 100,586, Dec. 5, 1979, Pat. No. 4,326,313. This application Aug. 5, 1982, Ser. No. 405,443
Int. Cl.[4] A43D *9/00*; A43B *13/18, 3/24*
U.S. Cl. 12—142 D **10 Claims**

1. A method of making an article of footwear including providing a preformed forward upper part and a preformed rear upper part, each upper part having a pair of laterally spaced lower edge portions, attaching a first connecting strip to the edge portions of the forward and rear upper parts on one side thereof, attaching a second connecting strip to the edge portions of the forward and rear upper parts on the opposite side thereof, providing a preformed sole unit with a recess adjacent each side thereof and shaped to receive a respective connecting strip by movement in a direction substantially perpendicular to the length of the connecting strip without deformation thereof, and assembling the upper parts with the



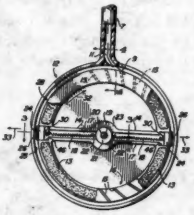
sole unit by positioning the connecting strips in the recesses by movement in said direction and securing the connecting strips in the recesses.

4,586,210

ROTATION BRUSH MECHANISM WITH SPEED CONTROL GOVERNOR

John L. Mueller, 824 E. Fern Dr. S., Phoenix, Ariz. 85014

Filed Mar. 11, 1985, Ser. No. 710,124
Int. Cl.[4] A46B *13/06*
U.S. Cl. 15—29 **8 Claims**



1. A cleaning apparatus for connection to a hose containing pressurized fluid, said cleaning apparatus comprising, in combination:

(a) a housing having a recess therein, a handle attached to the housing, means for connection to the hose, and an orifice in open communication with the hose connecting means and producing a high velocity jet of fluid into the recess;

(b) rotary bristle supporting means rotatably disposed in the recess, and having a bottom surface, for supporting a ring of bristles which are attached to the bottom surface;

(c) means including a plurality of vanes for receiving the jet of fluid to produce rotation of the rotary bristle supporting means; and

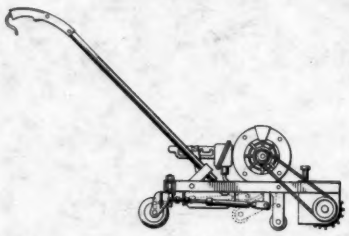
(d) centrifugal braking means disposed in said rotary bristle supporting means for frictionally engaging an interior surface of said housing in said recess when the rotary speed of the centrifugal braking means exceeds a predetermined level, to thereby prevent excessive amounts of fluid from being thrown radially outward from the cleaning apparatus by the rotating ring of bristles.

4,586,211

TILE SURFACE CLEANING APPARATUS

Dan D. Phillips, 442 Lyttleton Dr., Charlotte, N.C. 28211

Filed Jan. 22, 1985, Ser. No. 693,115
Int. Cl.[4] A47L *11/19*
U.S. Cl. 15—49 C **10 Claims**



1. Apparatus for cleaning a tile surface of the type having an arrangement of tiles with generally coplanar outward surfaces and separated from one another by grout areas of cementitious material relatively recessed from said outward surfaces, said apparatus comprising:

a frame;

an elongated brush member rotatably mounted on said frame for engagement with said tile surface, said brush member having first bristle means arranged circularly about said brush member at spacings along the length thereof for cleaning engagement in said recessed grout areas and second bristle means arranged about said brush member intermediately of said first bristle means for cleaning engagement with said outward surfaces, and said second bristle means being relatively softer than said first bristle means; and

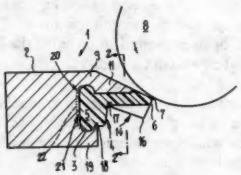
driving means mounted on said frame for rotating said brush member for moving said first and second bristle means during their said engagements with said grout areas and said outward surfaces to provide a scrubbing action thereof.

4,586,212

CYLINDER WIPING BLADE SYSTEM

Hermann Gasser, Frauenfeld, Switzerland, assignor to Galipag, Frauenfeld, Switzerland

Filed Jun. 15, 1984, Ser. No. 620,853
Claims priority, application Switzerland, Jun. 20, 1983, 3360/83
Int. Cl.[4] G03G *15/00*
U.S. Cl. 15—256.51 **20 Claims**



1. Blade structure for wiping cylinders of textile machines, comprising in combination:

a wiping blade having a mounting base along a length thereof; and

a mounting bar having a longitudinal slot shaped for receiving said mounting base in interlocking engagement over said length;

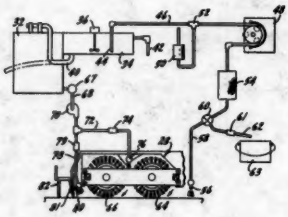
said wiping blade having a wiping edge and a corrugated back side opposite said wiping edge.

4,586,213

MACHINE FOR PREPARING A CONCRETE SURFACE FOR COATING

Charles W. Bricher, St. Paul, and Mark E. Snetting, Eden Prairie, both of Minn., assignors to Tennant Company, Minneapolis, Minn.

Filed Jan. 3, 1985, Ser. No. 688,578
Int. Cl.[4] E01H *1/00*
U.S. Cl. 15—320 **11 Claims**



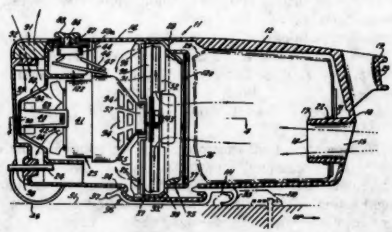
1. In a machine for removing a membrane adhering to a concrete surface, a movable frame adapted to travel over the concrete surface, means on the frame for applying a mixture including a solvent and an inactive acid to the surface, at least one power driven brush on the frame for agitating the mixture after it is applied to the surface to thereby abrade the membrane with the mixture thereon to rapidly loosen and disintegrate the membrane so as to expose the concrete surface, means on the frame for thereafter applying sufficient water to the thus agitated mixture on the abraded membrane so as to activate the acid, means on the frame for further abrading the membrane to more completely expose the concrete and to agitate the mixture so that it will more quickly etch the exposed concrete, means on the frame for thereafter applying sufficient additional water to flood the surface, and pickup means on the frame for thereafter picking up the membrane, the mixture and the water so that the etched exposed concrete is ready for a new surface coating after a relatively short drying period.

4,586,214

COMPACT VACUUM CLEANER

Robert C. Berfield, Jersey Shore, Pa., assignor to Shop Vac Corporation, Williamsport, Pa.

Division of Ser. No. 559,335, Dec. 8, 1983, Pat. No. 4,547,927.
This application Oct. 5, 1984, Ser. No. 658,353
Int. Cl.[4] A47L *5/36*
U.S. Cl. 15—327 C **12 Claims**



1. A vacuum cleaner including a casing comprising a tank section for storing dirt picked up by said vacuum cleaner, and

a housing section to the rear of said tank section; a fan means within said casing; a motor disposed within said housing section and having an output shaft drivingly connected to said fan means to create a main air stream flowing through said casing by drawing air into said tank section through an inlet at the front thereof and exhausting air through an outlet at the rear of said housing; said shaft extending in a front to rear direction and said main air stream moving longitudinally of said shaft to cool said motor; first means defining a chamber in front of said motor and within which said fan means is rotatably disposed; wheel means at one end of said casing; a buckle member mounted on one of said sections and including a latch portion operatively engageable with a cooperating formation in the other of said sections to releaseably secure said sections together; said buckle member also including a skid portion engageable with a surface on which said wheel means rests to support said vacuum cleaner in a position generally parallel to such surface; said buckle also including a hook portion engageable with a wall bracket for hanging said vacuum cleaner in a vertical position.

4,586,215

APPARATUS FOR REMOVING THE BREAST FROM THE EVISCERATED CARCASS OF CHICKENS OR THE LIKE

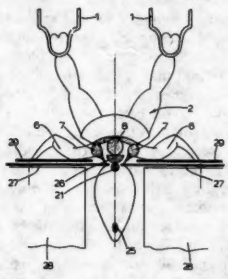
Pieter Meyn, Noordeinde 68C, 1511 AE Oostzaan, Netherlands

Filed Sep. 23, 1983, Ser. No. 534,984

Claims priority, application Netherlands, Sep. 24, 1982, 8203704

Int. Cl.[4] A22C *21/00*

U.S. Cl. 17—11 **12 Claims**



1. An apparatus for removing the breast from the eviscerated carcass of a chicken or other bird having an abdominal opening and a neck opening cut therein, comprising

means for conveying the carcass hanging by the legs in a position with the breast part thereof facing forwards,

a trough-like guide channel member extending below said conveying means for supporting and guiding the breast of an advancing carcass in a substantially horizontal position,

a mandrel longitudinally arranged substantially horizontally above said guide channel member and extending past the rear end of said channel member, said mandrel having a forward portion freely extending in a direction facing the carcasses advanced by the conveying means and adapted to enter the body cavity through the abdominal opening and to leave said cavity through said neck opening of the carcass,

guide means secured to the lower side of said mandrel and extending rearwardly and downwardly past the rear end of said channel member for pressing the chest of a carcass downwardly from the inside thereof as the latter is pulled forwardly on said mandrel by said conveying means, and

a pair of cutting members arranged to the rear of said channel member closely to and on both sides of said mandrel for cutting and removing the breast from the carcass.

4,586,216

DEVICE FOR STUNNING ANIMALS INTENDED FOR SLAUGHTER BY ELECTRIC DISCHARGE

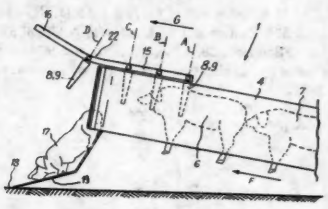
Jean Grajoszex, Le Moulin Foulon, 61120 Crouttes, France

Filed Sep. 25, 1984, Ser. No. 654,081

Claims priority, application France, Sep. 29, 1983, 83 15481

Int. Cl.[4] A22B *3/06*

U.S. Cl. 17—1 E **10 Claims**



1. In a device for stunning animals intended for slaughter by electric discharge, of the type comprising means for conveying said animals, at least two electrodes, a carriage to support said electrodes, and guiding means such as guide rails parallel to the means for conveying the animals to receive the said carriage and to guide it between a first active position for which the electrodes are adapted to be positioned on either side of the animal's head and a second retracted position allowing evacuation of the animal, wherein the electrode-carrying carriage is mounted to roll freely and it is adapted to move along the guide rails from its active position towards its retracted position simply by the animal pushing it, and the guide rails and the means for conveying the animals, follow upwardly inclined parallel directions, from the active position towards the retracted position, the carriage thus being adapted to accompany the advance movement of the animal during electrocution and, after the stunned animal has collapsed, to redescend freely to gravity to its initial position ready for the following animal.

4,586,217

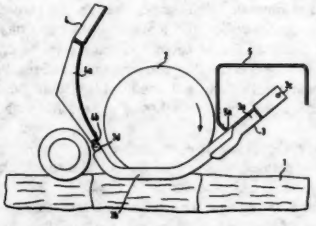
GRATE FOR A FIBER BALE OPENER

Andreas Kranefeld, Erkelenz, and Axel Thannheiser, Hof, both of Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

Filed Jan. 24, 1985, Ser. No. 694,252

Int. Cl.[4] D01G *7/12*

U.S. Cl. 19—80 R **4 Claims**



1. In a bale opener including an opening roller arranged for travel over fiber bales, opening elements on the opening roller arranged to engage top faces of the fiber bales, a grate travelling with the opening roller and formed of a plurality of parallel spaced grate bars each having opposite first and second ends; an arm rigidly connecting the first ends of said bars; said arm being supported for pivotal motion about a generally horizontal axis; said grate being open at said second ends of said grate bars; said opening elements projecting between the grate bars towards the bale top; the improvement comprising

an abutment supported in a swinging path of said second ends; said abutment constituting a stop cooperating with said second ends for determining a limit of said swinging path.

4,586,218

CHUTE FEED APPARATUS FOR A CARDING MACHINE

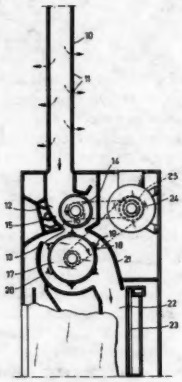
Akiva Pinto, 524 Eastwood Dr., Gastonia, N.C. 28052

Filed Sep. 28, 1984, Ser. No. 655,974

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1983, 3336517

Int. Cl.⁴ D01G *15/00, 9/06*

U.S. Cl. 19—105 **9 Claims**



1. In chute feed apparatus for processing fibrous flock to a batt for feeding to a carding machine, and comprising upper and lower chutes, rotatable feed and beater rollers, and a plurality of guide walls, said upper and lower chutes intercommunicating with one another through intermediate channelways wherein the improvement comprises:

a first channelway being defined between a descending surface of said rotatable feed roller and an adjacent spaced-away curved first guide wall, an exit opening defined at least in part by a lower terminal portion of said first guide wall;

a second channelway defined between the ascending surface of said beater roller and a terminal portion of said first guide wall, and said second channelway being further defined between the descending portion of the surface of said beater roller and a descending adjacent portion of a second curved guide wall, and means for rotating said rollers;

said feed roller being disposed adjacently above a restricted opening formed between said upper and lower chutes and adjacent said exit opening;

means for rotating said feed roller in a direction toward the bottom of said upper chute toward said first guide wall and said exit opening;

said beater roll being disposed adjacent the top opening of said lower chute and below said exit restricted opening in a manner that said beater roll is offset in its position relative to said exit opening toward said first guide wall; and

means for rotating said beater roll in a direction toward said lower terminal portion of said first guide wall, toward said restricted opening, and thereafter away from said restricted opening toward the top portion of the second guide wall adjacent said decending portion of said second guide wall.

4,586,219

TORQUE-SPLITTING PINION GEAR FOR TWIN-SCREW MACHINES

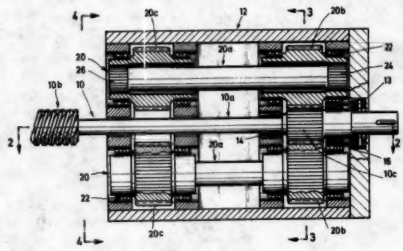
Josef A. Blach, Wilhelmstrasse 24, D - 7144 Asperg, and Rudolf P. Fritsch, Goslarer Strasse 58, D - 7000 Stuttgart 31, both of Fed. Rep. of Germany

Filed Jan. 20, 1983, Ser. No. 459,322

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1982, 3201952

Int. Cl.⁴ F16H *57/00, 37/06;* **B21C** *23/00;* **B28C** *1/16*

U.S. Cl. 74—410 **8 Claims**



1. A torque-splitting gear assembly for twin-screw machines, comprising a direct-driven first screw shaft having a screw section (**10***b*), a coupling shaft (**20**) parallel to said first screw shaft, said coupling shaft designed as a torsion bar, a first output pinion (**10***c*) on said first screw shaft, a first drive pinion (**20***b*) on said coupling shaft, said first drive pinion meshing with said first output pinion, a second screw shaft (**30**) parallel to the first screw shaft, said second screw shaft having a screw section (**30***b*), a second drive pinion (**30***c*) on said second screw shaft, a second output pinion (**20***c*) on said coupling shaft, said second drive pinion meshing with said second output pinion, said second drive pinion being axially offset relative to said first output pinion towards the screw section (**10***b*) of the first screw shaft, characterized in that the torsion resistance of the coupling shaft (**20**) and the transmission ratio between the first screw shaft, coupling shaft and second screw shaft are adjusted to the torsion resistance of a section of the first screw shaft lying between the output pinion (**10***c*) of the first screw shaft and the drive pinion (**30***c*) of the second screw shaft such that both screw shafts (**10, 30**) are always in a predetermined phase relation with each other, that at least one of said pinions (**10***c*, **20***b*, **20***c*, **30***c*) is rotatable and lockable in position relative to its shaft, that said first output pinion (**10***c*) and said second drive pinion (**30***c*) have the same diameter, that said first drive pinion (**20***b*) and said second output pinion (**20***c*) have the same diameter, and that two identical coupling shafts (**20**) are provided, said coupling shafts being symmetrically disposed with relation to the plane defined by the axes of the two screw shafts (**10,30**) and being spaced the same distance from said axes.

4,586,220

SEPARABLE SLIDE FASTENER

Toyosaku Ogura, and Seiji Nishino, both of Kurobe, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Mar. 15, 1985, Ser. No. 712,146

Claims priority, application Japan, Mar. 15, 1984, 59-50098

Int. Cl.⁴ A44B *19/36*

U.S. Cl. 24—433 **5 Claims**

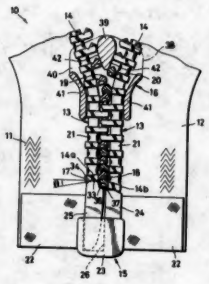
1. A separable slide fastener comprising:

(a) a pair of stringer tapes each carring on its one longitudinal edge a row of coupling elements, each said coupling element having a bifurcated leg portion mounted astride said one longitudinal edge and a coupling head portion projecting transversely beyond said longitudinal edge;

(b) a slider slidably mounted on said rows of coupling elements for taking them into and out of interdigitating en-

gagement with each other to close and open the slide fastener;

(c) a separable terminal assembly comprising a retainer mounted on one of said stringer tapes at one end thereof, and a separable pin mounted on the other stringer tape at one end thereof and releasably engageable with said retainer, said separable pin having a pair of plates disposed one on each side of said other stringer tape and interconnected at respective one longitudinal edges, each said plate having on the other longitudinal edge thereof a flange engaging said other stringer tape and an end wall



held in abutting engagement with the endmost coupling element located next to said separable pin; and

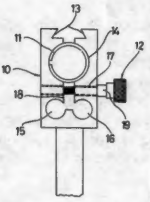
(d) said end wall sloping down in a direction from said one longitudinal edge of said plate toward said other longitudinal edge of the same so that said endmost coupling element tilts in a direction away from the next adjacent coupling element, said flanges terminating short of said sloped end walls of said plates so as to define therebetween a pair of openings for allowing said one longitudinal edge of said other stringer tape to flex laterally toward the other longitudinal edge of said other stringer tape.

4,586,221

UNIVERSAL CLAMPING DEVICE FOR DIAL INDICATORS

Chun-San Wu, 6F-3, No. 363, Fuhsing Rd. Sec 3, Taichung, Taiwan

Filed Nov. 28, 1984, Ser. No. 675,749
Int. Cl.[4] A44B *21/00*
U.S. Cl. 24—535 **3 Claims**



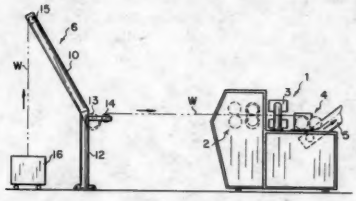
1. A clamping device for dial test indicators and like instruments comprising a bifurcated member defining a pair of arms separated by a central elongate slot, said arms defining a pair of adjacent circular openings at the base of the slot, a larger central circular opening intermediate the length of the slot, and rebates at the end of the slot defining a receiver for a dovetail key, the device further including an adjustment screw in threaded bores connecting said arms intermediate the base of the slot and said larger diameter opening.

4,586,222

APPARATUS FOR TREATING AND STRAIGHTENING TUBULAR FABRIC

Frank Catallo, and Donald Foreman, both of 103 Harbor Rd., Port Washington, N.Y. 11050-0105

Filed Feb. 24, 1984, Ser. No. 583,209
Int. Cl.[4] D06C *5/00*
U.S. Cl. 26—51.3 **3 Claims**



1. A fabric finishing machine for finishing a tubular fabric where said machine has a fabric spreader for spreading the tubular fabric into a flattened tube, edge drive means adapted to engage edges of a flattened tube to move the tube over the spreader and through said machine, a fabric treatment station for treating the fabric positioned downstream of said edge drive means in the direction of flow of fabric through the machine and a control means for maintaining and controlling the dimensional configuration of said flattened tube as it passes through said machine; characterized in that said control means comprises a pair of spaced apart opposed control rolls rotatably driven in opposite directions with said rolls being positioned downstream of said fabric treatment station with respect to the passage of fabric through said machine with said fabric extending over and contacting a substantial arc of the periphery of each control roll and with each roll being roughened and heated and in separate frictional driving engagement with the fabric and with the spacing between said rolls being greater than the thickness of said fabric, means for separately rotatably driving the control rolls by independent power source, and speed control means for varying the speed of rotation of the control rolls with respect to the speed of said edge drive means whereby when said machine is operated to provide control of cross-line configuration, lateral portions of said tubular fabric extending between said control rolls and said edge drive means may be positioned with respect to the edges of the fabric driven by said edge drive means to control cross-line configuration of said tubular fabric without imparting crease or flattened appearance to the fabric and whereby when said machine is operated to provide control of width, bunching of fabric leaving said spreader and extending to said control rolls may be prevented.

4,586,223

MACHINE FOR STRAIGHTENING AND POLISHING A ROUND BAR

Kotaro Tsukamoto, 6-54, Toneyama 6-chome, Toyonaka-City, Osaka Prefecture, Japan

Filed Aug. 27, 1984, Ser. No. 644,676
Int. Cl.[4] B24B *39/04*
U.S. Cl. 29—90.5 **1 Claim**

1. A machine for straightening and polishing a round bar, said machine comprising:

a base;

a plurality of straighteners arranged parallel to each other on the base;

a plurality of rods, each extending parallel to each other from the plurality of straighteners;

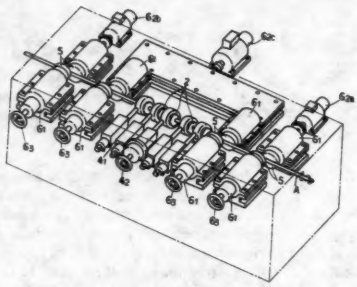
a plurality of nozzle-like straightening tubes, each being rotatably supported by one of the plurality of rods such that central longitudinal axes of the nozzle-like straightening tubes are coaxially aligned with each other so that the

round bar may be passed through the plurality of nozzle-like straightening tubes;

a plurality of squeezing-and-rubbing machines arranged on the base, at least one of said squeezing-and-rubbing machines being placed before and at least one being placed after the plurality of straighteners;

a plurality of rotating shafts, each extending from one of the plurality of squeezing-and-rubbing machines and each having a central longitudinal axis; and

at least one pair of polishing discs being mounted on the plurality of rotating shafts with a separating space sufficient to allow the round bar to pass between the at least one pair in close contact with a part of each of said discs;



said at least one pair of polishing discs facing each other and said central longitudinal axes of the rotating shafts upon which said facing polishing discs are mounted being offset from but parallel to each other and rotating in the same direction so that the round bar being passed between the at least one pair of facing polishing discs is rotated;

whereby the round bar is straightened while being passed through the plurality of straightening tubes and is simultaneously polished while being rotated by the polishing discs.

4,586,224

GUIDE ROLLER FOR PAPER AND FOIL HANDLING APPARATUS SUCH AS PRINTING PRESSES

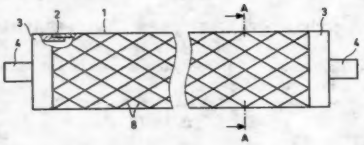
Bruno Sartor, Niederzier; Jürgen Hüftle, Langerwehe; Burkhart Strasmann, Aachen, and Franz-Josef Fischer, Juelich, all of Fed. Rep. of Germany, assignors to Uranit GmbH, Juelich, Fed. Rep. of Germany

Filed Aug. 9, 1984, Ser. No. 639,027

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1983, 8322639[U]; Sep. 1, 1983, 3331566

Int. Cl.⁴ A01B *29/00*

U.S. Cl. 29—121.2 **6 Claims**



1. A roller for paper or foil handling machines such as printing presses, said roller comprising a cylinder consisting of fiber reinforced plastic material having alternate layers of circumferentially wound fibers and helically wound fibers, some of said helically wound fiber layers including groups of strings which are spaced from one another with the groups of adjacent layers being wound in the opposite sense so as to form rhombus-shaped gaps therebetween and the outermost layer having circumferentially wound fibers which, during hardening of the plastic material, are pressed onto said helically wound fiber layers and into said gaps so as to provide for a roller surface with rhombus-shaped texture and high wear resistance.

4,586,225

APPARATUS FOR THE TRANSFER OF A COMPLETE TURBINE MODULE FROM A BALANCING MACHINE TO AN ENGINE AND VICE VERSA, AND METHOD FOR OPERATING THE SAID APPARATUS

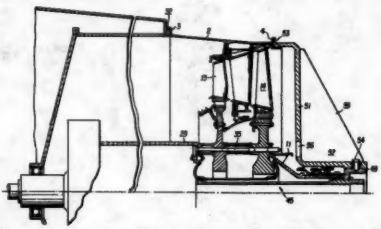
Jean G. Bouiller, Brunoy, and Jean-Claude L. Delonge, Corbeil-Essonnes, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.-M.A., Paris, France

Filed Mar. 29, 1984, Ser. No. 594,904

Claims priority, application France, Apr. 15, 1983, 83 06157

Int. Cl.⁴ B21K *3/04*; B23P *19/00*

U.S. Cl. 29—156.8 R **6 Claims**



1. An apparatus for transferring a turbine module from a balancing machine to an engine assembly and vice versa, the module comprising an external casing of the inlet guide nozzle array of the turbine within which the stator stage of the turbine is mounted, the turbine rotor incorporating disks and blade rows and is secured to the transmission shaft of the engine by tie bolts positioned in an array around the rotor axis and extending longitudinally of the axis, and the module further comprising a bell housing at the downstream end of the rotor and carrying a mounting seating, said apparatus comprising:

means for mounting said external casing on a balancing machine,

means for interconnecting temporarily the disks of the rotor, and

transport means providing for interconnection of the turbine disks after withdrawal from the balancing machine wherein said means for mounting said external casing further comprises,

an upstream part with a conical base having a seating enabling mounting of the module on the balancing machine,

a downstream edge portion having a flange for securing the means for mounting said external casing to said external casing of the module, and

a downstream part carrying an internal, cylindrical, portion co-axial and cooperating with said mounting seating of the bell housing and further comprising,

flange means arranged at an outer, peripheral edge thereof to be secured to a downstream flange of said external casing of the module.

6. A method of transferring a complete turbine module between an engine assembly and a balancing machine and subsequently from the balancing machine to an engine assembly, the module incorporating an external casing of the inlet guide nozzle array of the turbine within which the stator stage of the turbine is mounted, the turbine rotor incorporating disks and blade rows and being secured to the transmission shaft of the engine by tie bolts positioned in an array around the rotor axis and extending longitudinally of the axis, the module further comprising a bell housing at the downstream end of the rotor and carrying a mounting seating, the method comprising the steps of

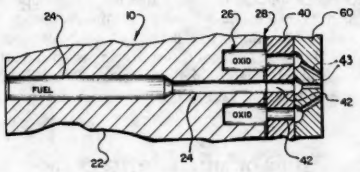
I. balancing the turbine rotor within the module including the steps of:
(a) securing an upstream part of the external casing of the inlet guide nozzle array to an upstream part of mounting means,
(b) securing the rotor of the turbine to the shaft of the balancing machine by tie bolts,
(c) securing the downstream part of the mounting means to a downstream part of the external casing of the inlet guide nozzle array, the cylindrical part of the downstream part of the mounting means cooperating with the seating remaining mounted on the bell housing, and
(d) balancing of the rotor,
II. transferring the turbine module, the rotor having been balanced, including the steps of:
(a) withdrawing the shaft assembly mounting means and turbine module from the balancing machine and placing the module in a vertical position within a disassembling means,
(b) locating a clamping screw member along an axis of said bell housing,
(c) unscrewing of the nuts of the tie bolts of the shaft of the balancing machine,
(d) removing the rear part of the mounting means,
(e) locating the downstream part of the transport device on a flange of the turbine module,
(f) disassemblying the casinag of the inlet guide nozzle array from the front part of the mounting means, the front part and the tie bolts remaining in place on the shaft of the balancing machine, and
(g) locating the front part of the transfer device secured with the aid of the said tie bolts and securing the disks; and
III. locating the turbine module in the engine including the steps of:
(a) removing the transfer tie bolts of the front part of the transfer means,
(b) presenting the module to the engine, then securing tie bolts remaining on the transmission shaft in securing holes of the disks, and guiding the assembly into position,
(c) securing the casing of the inlet guide nozzle array of the module on the casing of the combustion chamber, and
(d) removing the rear part of the transport means.

4,586,226

METHOD FOR FABRICATING A SMALL-ORIFICE FUEL INJECTOR

Lyle D. Fakler, and Irving Kaith, both of Canoga Park, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 30, 1983, Ser. No. 538,072
Int. Cl.[4] B21D *53/00*
U.S. Cl. 29—157 R **9 Claims**



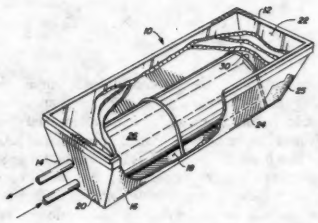
1. A method for fabricating a face plate for a fluid injector comprising the steps of:
obtaining at least one mandrel formed from a plastic material and having a plurality of legs each of which is connected to a coupling tab at one end, has an intermediate orifice-forming section and a support section at another end;
forming bores in the face plate to accept the support sections of the legs of at least one mandrel;
placing the support sections of the mandrel legs in said bores;
forming a bonded layer of rigid material around the orifice-forming sections of said mandrel;
removing the tab section of said mandrel;
dissolving out the remaining sections of said mandrel from the bonded layer to leave the face plate with ducts and orifices therein; and
coupling an inner end of each duct to a conduit capable of containing fluid.

4,586,227

METHOD OF MAKING A SOLAR WATER HEATER

S. Douglas Cornell, 11 E. Orange Grove Rd. #1513, Tucson, Ariz. 85704

Filed May 7, 1984, Ser. No. 607,974
Int. Cl.[4] B23P *15/26*; F24J *2/14, 2/46*; B32B *31/06*
U.S. Cl. 29—157 R **3 Claims**



1. A method of constructing an enclosure for a passive solar heater of the type combining a heat absorber and fluid storage in a tank adapted to be exposed to solar energy, said method comprising:
(a) providing a male mold member having a mold surface generally conforming to the interior shape of the enclosure, said mold surface defining a support trough for said fluid storage tank and further defining curved surfaces oppositely adjacent said support trough;
(b) providing a female mold having a mold surface generally conforming to the exterior shape of the enclosure;
(c) applying a shell material to said female mold surface with the shell having increased thickness in predetermined areas by spraying and allowing the shell material to at least partially harden;
(d) forming a pattern of reflective material having a shape conforming at least to the curved surfaces of the male mold surface and the enclosure interior and temporarily securing same to the male mold surface;
(e) placing the male and female molds in engagement forming a mold cavity therebetween;
(f) filling the said mold cavity with an insulative material and allowing the insulative material to set-up; and
(g) removing the shell, insulative material and reflective lining from the mold cavity as an integral unitary structure, leaving the mold members behind.

4,586,228

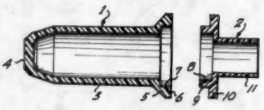
TOOL KIT FOR INSTALLING TRANSMISSION SEALS

Charles A. Rodolf, 10304 - 15th Ave. N.W., Seattle, Wash. 98177

Filed Aug. 16, 1984, Ser. No. 641,818
Int. Cl.[4] B23P *19/02*
U.S. Cl. 29—235 **5 Claims**

1. A tool for installing an annular seal having a substantially rigid outer body and a resilient inner ring in the hole of a vehicle housing into which a shaft of the vehicle extends, said tool comprising separate base and adapter components manually connectible to form an elongated composite driver having a rear end portion formed by said base component and a front

end portion formed by said adapter component, said adapter component having a central hollow projection extending forward from said base component when said composite are connected, the outer diameter of said central hollow projection being small enough that the resilient ring of the seal can be inserted over said central hollow projection so as to be carried thereby, the inner diameter of said central hollow projection being large enough that said central hollow projection can be inserted over the vehicle shaft, said base component being elongated and having a closed rear end portion adapted to have force applied to it, an elongated central portion forming a handle and a front end portion connected to said central portion, the front end of said base component forming an annular flange having a flat radial surface lying in a plane perpendicular to the axis of said base component and a central



recess forming a socket encircled by said flange, said adapter component having a rear end projection shaped complementally to said base socket and manually insertable therein to connect snugly but manually and removably said adapter component to said base component, said adapter component having an intermediate annular flange with a flat radial rear face substantially contiguously engageable against the front end of said base component to limit the degree of insertion of said adapter rear end projection into said base socket, and said adapter component central hollow projection extending forward from said intermediate flange and being of a diameter substantially less than the diameter of said intermediate flange for receiving the resilient ring of the seal so that force applied to said base component rear end portion in a forward direction is transferred to the seal to press the rigid body of the seal into the vehicle housing hole.

4,586,229

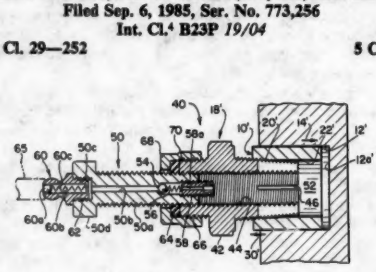
BUSHING BEARING EXTRACTOR

Michael F. Pendola, 202-32 47th Ave., Bayside, N.Y. 11361

Filed Sep. 6, 1985, Ser. No. 773,256

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—252 **5 Claims**



1. An extractor for removing a bushing bearing from its operative position in a cylindrical opening having a surface closing one end thereof, said extractor comprising a first tap member having external threads in threaded engagement with said bushing bearing and an internally threaded throughbore bounding a pressure chamber in communication with said end surface of said cylindrical opening, a second operative member having external threads threadably engaged in said internally threaded throughbore of said tap member so as to form a closure for said pressure chamber and having a throughbore centrally thereof in communication with said pressure chamber, and at least one check valve in said throughbore of said second operative member so as to permit the directional flow of pressure fluid only into said pressure chamber and obviating any reverse flow therefrom, whereby a volume of pressure fluid is injected into said pressure chamber to apply pressure against said cylindrical opening end surface to initially cause movement in said attached tap member and bushing bearing in an exiting direction from said cylindrical opening, and in supplement thereto said second operative member is also adapted to be threadably rotated to cause the advancement of said tap member with its attached bushing bearing in an exiting direction from said cylindrical opening to thereby cause the extraction thereof.

4,586,230

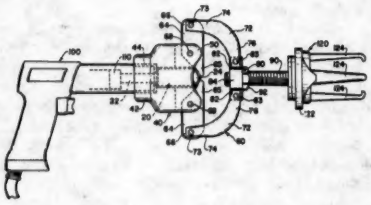
PORTABLE PULLING APPARATUS

Richard Harydzak, 201 Brierwood Dr., and J. Alan Kraykovic, 11021 Azelea Dr., both of Pittsburgh, Pa. 15235

Filed Jul. 13, 1984, Ser. No. 630,826

Int. Cl.[4] B21C *1/12;* **B21B** *33/00;* **B25D** *17/06*

U.S. Cl. 29—254 **13 Claims**



1. A portable pulling apparatus for attachment to hand held air chisels and the like of the type having a reciprocating piston utilized to provide a series of outwardly directed impact thrusts comprising:

(a) a plunger adapted for attachment to a reciprocating piston of an air chisel;

(b) a housing adapted at one end thereof for attachment to said air chisel and having a bore therethrough sized to receive said plunger, said plunger being attached to said piston in a manner allowing one end of said plunger to project from an opposite end of said housing at least during a portion of an outward thrust of said piston;

(c) linkage means pivotally attached intermediate its ends to said housing adjacent said one end of said plunger in a manner providing an impact end of said linkage means to extend at least partially over said one end of said plunger whereby said one end of said plunger impacts the impact end of the linkage means with each outwardly directed thrust of said piston; and

(d) connecting means pivotally attached to an opposite end of said linkage means whereby said linkage means causes the connecting means to be pulled inwardly with each outward directed impact thrust of said piston and attached plunger along a path which is substantially collinear with a path of travel of said piston.

4,586,231

MANUFACTURE OF METAL ARTICLES FROM WIRE

John Powderley, and Ronald W. Evans, both of Birmingham, United Kingdom, assignors to USM Corporation, Framington, Conn.

Filed May 13, 1985, Ser. No. 732,954

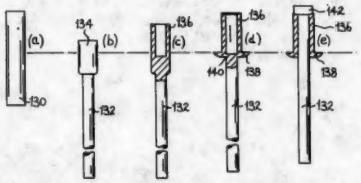
Claims priority, application United Kingdom, May 19, 1984, 8412882

Int. Cl.[4] B23P *17/00;* **B21K** *1/58*

U.S. Cl. 29—416 **8 Claims**

1. A method of making a metal article comprising a rod or pin with a separate sleeve or collar on it of the same material as

the rod or pin, comprising axially extruding a substantial length of a cylindrical blank to provide a stem of the rod or pin, subjecting a residual larger diameter portion of the blank to extrusion around a punch which results in a cylindrical sleeve



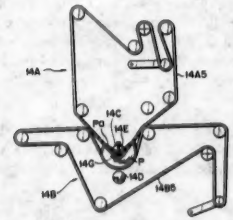
or collar with an internal diameter the same or slightly greater than that of the adjacent portion of the extruded stem, and joined to the stem by a short thin annular web, fracturing said web and inserting said adjacent portion of the rod or pin into the thus separated sleeve or collar.

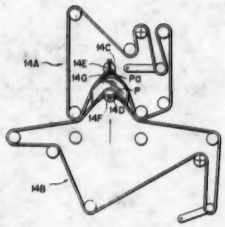
4,586,232

PAPER SHEET PROCESSING APPARATUS

Hideo Ohmura, Tokyo; Takeshi Oowa; Kunihiko Nakamura, both of Yokohama, and Masashi Nakada, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Oct. 11, 1983, Ser. No. 541,005
Claims priority, application Japan, Oct. 14, 1982, 57-180227
Int. Cl.[4] B23P *19/00*
U.S. Cl. 29—426.3 **8 Claims**





8. A method of processing paper sheets which have been sealed with wrapping bands in batches, comprising the steps of:

carrying a plurality of said batches of paper sheets from an entry point to a processing point;

separating said batches and singly removing each single batch for processing;

holding said each batch of paper sheets in an area of said batch which is free from said wrapping band;

bending said each batch of paper sheets with the axis of the bending being perpendicular to said wrapping band;

holding the portion of said band left free by said bending operation;

bending said batch in another direction; and

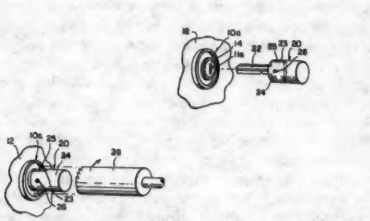
cutting said wrapping band on the opposite side from which it is being held while said sheets are bent in said other direction.

4,586,233

METHOD OF DISABLING VARIOUS TYPES OF LOCK CYLINDERS IN GENERAL MOTORS MOTOR VEHICLES

Frank Markisello, 91-10 Liberty Ave., Ozone Park, N.Y. 11417

Filed May 9, 1984, Ser. No. 608,580
Int. Cl.[4] B23P *19/00*
U.S. Cl. 29—426.4 **3 Claims**



1. A method removing an ignition lock cylinder having a side bar in a dashboard from a General Motors motor vehicle made between 1950 to 1968 and trucks up to 1979 which comprises:

(a) inserting an interchangeably mounted key portion into a center slot of a block portion of a guide tool having a pilot hole so that the proper key portion can be readily used for the respective ignition lock cylinder having the side bar;

(b) placing the key portion of the guide tool having the pilot hole into the ignition lock cylinder having a keyway;

(c) placing a drill bit through the pilot hole of the guide tool;

(d) drilling the drill bit into a poke hole in the ignition lock cylinder to disengage the side bar within;

(e) removing the drill bit from the pilot hole of the guide tool;

(f) removing the key portion of the guide tool from the keyway of the ignition lock cylinder;

(g) placing tip of a screwdriver into the keyway of the ignition lock cylinder;

(h) turning the ignition lock cylinder to accessory position;

(i) putting a stiff wire in the poke hole in face of the ignition lock cylinder and turn at least one degree further; and

(j) removing the ignition lock cylinder by hand.

4,586,234

TRANSFER APPARATUS AND METHOD FOR AIR SPRING ASSEMBLY APPARATUS

Bruce T. Choate, Akron, and Richard C. Houck, Clinton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 22, 1983, Ser. No. 564,490
Int. Cl.[4] B21D *39/03;* **B23P** *11/00, 19/04;* **B66F** *1/00*
U.S. Cl. 29—430 **28 Claims**

1. A method of loading air spring components and unloading an air spring from an air spring assembly apparatus in which an end cap is inserted in at least one open end of a tubular member for crimping of a ring positioned over said tubular member against the wall of said end cap comprising:

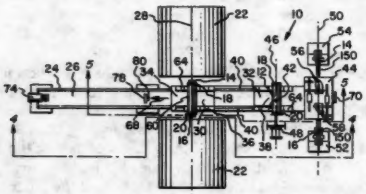
(a) moving a shuttle mechanism including an air spring unloader, a tubular member loader and an end cap holder to a first position with said air spring unloader at an oper-

ating position of said assembly apparatus for receiving an assembled air spring from said assembly apparatus, with said loader positioned at a feeding position spaced from said operating position for receiving said tubular member and further with said end cap holder at an end cap feeding position spaced from said operating position for receiving an end cap;

(b) moving said shuttle mechanism to a second position with said unloader positioed at an unloading location for transfer of said air spring from said unloader and with said end cap holder at said operating position for transfer of an end cap to said assembly apparatus; and

(c) moving said shuttle mechanism to a third position with said loader positioed at said operating position of said assembly apparatus for transfer of said tubular member to said assembly apparatus.

10. A loading and unloading apparatus for loading air spring components and unloading an air spring from an assembly apparatus in which an end cap is inserted in at least one open end of a tubular member for crimping of a ring positioned over said tubular member against the wall of said end cap comprising a track member providing a path adjacent an operating position of said assembly apparatus, a shuttle mechanism having a base member carried by said track member and movable along said path, an air spring unloader and an end cap holder mounted on said base member at spaced-apart locations, a tubular member laoder mounted on said base member at a location spaced from said unloader and said end cap holder, said shuttle mechanism being movable along said path to a first position where said air spring unloader is positioned at said



operating position of said air spring assembly apparatus for transferring said air spring to said unloader, said shuttle mechanism being movable to a second position where said end cap holder is positioned at said operating position for transferring said end cap to said assembly apparatus and said shuttle mechanism being movable to a third position where said tubular member loader is positioned at said operating position for transferring said tubular member to said assembly apparatus.

24. A transfer apparatus for a tubular member comprising a support member, a vertically movable cradle mounted on said support member for supporting said tubular member, power means to raise the lower said cradle relative to said support member, said cradle comprising two spaced-apart sections adjustably mounted on said support member for changing the distance between said sections to accommodate different length tubular members, and said transfer apparatus further including an overarm for holding said tubular member in said cradle, said overarm being pivotally mounted on said support member and power means for swinging said overarm between a closed clamping position over said cradle and an open release position spaced from said cradle.

25. A transfer apparatus for an end cap member comprising a bed plate member, a sliding support member slidably mounted on said bed plate member, an expandable chuck mounted on said sliding support member for transferring said end cap member between a retracted position of said chuck over said transfer apparatus to an extended position of said chuck for picking up said cap member from a loading support for inserting said cap member in an air spring assembly apparatus, first power means for actuating said expandable chuck and a second power means for moving said chuck between said retracted position and said extended position.

4,586,235

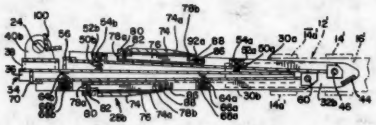
PALLET STRIPPER APPARATUS

Enzo Benvenuto, 9145 Sandpiper Ct., Orland Park, Ill. 60462

Filed Mar. 14, 1985, Ser. No. 711,986

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—564.3 **17 Claims**



1. Apparatus for stripping pallets of the type which include at least two runners having opposite longitudinal mounting surfaces, and a plurality of pallet boards affixed to each of the opposite mounting surfaces by shearable fastener means which pass through the interface between each pallet board and the runners; said apparatus comprising, in combination, guide arm means including at least one pair of guide arms defining leading ends, means supporting said pair of guide arms for pivotal movement relative to each other between generally parallel positions and outwardly inclined positions forming a generally V-shaped relation therebetween, means biasing said guide arms toward their said outwardly inclined positions, and at least one elongated shearing blade supported by a selected one of said guide arms in transverse relation thereon, said shearing blade being operative to shear the fastening means at the interface of the pallet boards mounted on the corresponding selected ones of said runner mounting surfaces during relative movement between said pallet stripping apparatus and a pallet such that the lead ends of said guide arms are introduced between pallet boards on opposite mounting surfaces of the runner.

4,586,236

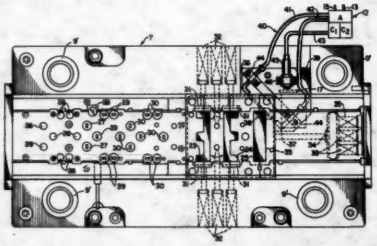
METHOD AND APPARATUS FOR FORMING STACKS OF LAMINATED METALLIC MEMBERS

Carl E. Jones, Cabot, Pa., assignor to Penn United Technology, Inc., Cabot, Pa.

Filed Jan. 17, 1984, Ser. No. 571,564

Int. Cl.[4] H02K *15/02*

U.S. Cl. 29—564.6 **11 Claims**



1. An apparatus for forming stacks of laminated metallic members in an automatic cycling press from a strip of metallic material, said apparatus, comprising:

a punch and die assembly, adapted for mounting within the press, including a plurality of first punches for forming coined areas in the metallic strip stock and a plurality of second punches for piercing and forming mechanical interlocks within the coined areas on said strip stock, said assembly including at least one laminate blanking punch

and a mating, open-ended die cavity for blanking and stacking interlocked laminates within the die cavity, said die cavity including means for compressively supporting edge portions of the descending stacks of laminations beneath the die cavity; means associated with the punch assembly for activating a selected number of said second punches whereby the areas of the mechanical interlocks in one laminate are blanked out upon receipt of an activation signal to form a base laminate of a next stack of laminates, whereby said base laminate, when blanked and stacked within the die cavity, rests against an uppermost lamination of a subjacent stack; and

measuring means associated with the punch and die assembly for sensing the height of the stack of metallic members being stacked within the die cavity, whereupon, when a predetermined stack height is reached, said measuring means transmits an activation signal to the punch activation means, whereby the activated second punches form a base laminate of a next stack of laminations, said blanked out mechanical interlock areas providing a generally flat exterior surface on each base laminate whereby a separation between each stack of laminations and a subjacent stack occurs beneath the blanking die cavity.

4,586,237

DRIVE MECHANISM FOR A CUT AND CLINCH UNIT

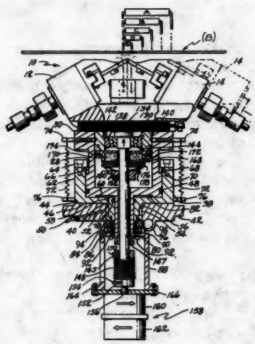
Vitaly Bandura, Danvers, and Robert J. Sooy, Marblehead, both of Mass., assignors to USM Corporation, Framington, Conn.

Filed Sep. 28, 1983, Ser. No. 536,681

The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.

Int. Cl.[4] B21F *1/00*

U.S. Cl. 29—566.3 **8 Claims**



1. A mechanism for cutting and clinching variable spaced leads of electronic components inserted into the openings in printed circuit boards comprising:

a. a support means;

b. a cylinder mounted on said support means;

c. a piston mounted in said cylinder;

d. a fixed cut and clinch head mounted on said piston;

e. a movable cut and clinch head mounted on said fixed head for movement toward and away from said fixed head to accommodate cutting and clinching variable spaced component leads;

f. a rack carried on said movable head and a pinion mounted on a driven shaft passing through said cylinder and said piston to drive said rack and move said movable head incremental spacings toward and away from said fixed head; and

g. drive means coacting between said cylinder and said support means to rotate said cylinder, said piston and said heads to accommodate cutting and clinching component leads having variable angular dispositions.

4,586,238

METHOD OF MANUFACTURING FIELD-EFFECT TRANSISTORS UTILIZING SELF-ALIGNED TECHNIQUES

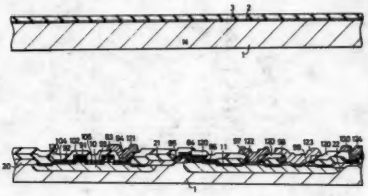
Yuji Yatsuda, Hachiohji, Japan; Takaaki Hagiwara, Stanford, Calif.; Ryuji Kondo, Kodaira, Japan; Shinichi Minami, Kokubunji, Japan, and Yokichi Itoh, Hachiohji, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 148,481, May 9, 1980, abandoned. This application Apr. 21, 1983, Ser. No. 487,085

Claims priority, application Japan, May 25, 1979, 54-63941

Int. Cl.[4] H01L *21/26, 21/31*

U.S. Cl. 29—571 **9 Claims**



1. A method for manufacturing semiconductor devices comprising:

locally forming an anti-oxidation film on a main surface of a semiconductor substrate of a first type of conductivity;

introducing impurities which impart a second type of conductivity into the surface of said substrate in the portions which are not covered by said anti-oxidation film;

forming a plurality of semiconductor regions of the second type of conductivity by oxidizing the surface of said substrate by using said anti-oxidation film as a mask, and forming an oxide film on said semiconductor regions;

removing said anti-oxidation film, and introducing impurities into the surface of said substrate among said semiconductor regions using said oxide film as a mask, whereby the impurities are introduced among the semiconductor regions in a self-aligned manner; and

forming insulated gate field effect transistors in said semiconductor regions, the forming of the transistors including providing gate electrodes on said semiconductor regions, and providing source or drain regions of said first type of conductivity in said semiconductor regions at the sides of said gate electrodes.

4,586,239

PROCESS OF MANUFACTURING A HIGH-FREQUENCY VERTICAL JUNCTION FIELD-EFFECT TRANSISTOR

Pierre Brière, Rueil Malmaison, France, assignor to Thomson-CSF, Paris, France

Filed Jun. 27, 1984, Ser. No. 625,256

Claims priority, application France, Jun. 30, 1983, 83 10909

Int. Cl.[4] H01L *21/74, 29/80*

U.S. Cl. 29—571 **3 Claims**

1. A process for manufacturing a high-frequency vertical junction field effect transistor, the structure of which includes an embedded grid constituted by parallel bars, comprising the following steps:

successively depositing, on a silicon substrate, layers of first conductivity type silicon oxide of a first thickness, silicon nitride and resin and successively etching these layers so as to form an arrangement of parallel bars of silicon of the first conductivity type protected by nitride and resin;

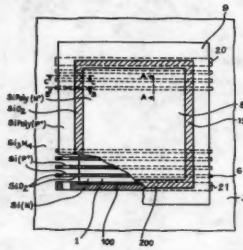
implanting an impurity of a second type of conductivity type, different from the first conductivity type, masked by the three above-described layers, with an energy such that this impurity is implanted at a certain depth within the

substrate and forms parallel implanted bars having said second type of conductivity;

removing the resin;

growing a silicon oxide layer at low temperature between the bars of silicon of the first conductivity type of protected by silicon nitride, this second oxide layer being thicker than the first and contacting the implanted bars of the second type of conductivity;

exposing the ends of the bars of the second type of conductivity, removing the silicon nitride and etching the silicon oxide to a thickness corresponding to the first thickness;



depositing a polycrystalline silicon layer;

separating the polycrystalline silicon layer into first and second zones said first zone being partly in contact with said first conductivity type silicon substrate but not in contact with the ends of said second conductivity type bars, said second zone being doped according to said first conductivity type, said second zone being partly in contact with the ends of the bars of the second type of conductivity but not in contact with the first conductivity type silicon substrate, said second zone being doped with the second type of conductivity.

4,586,240

VERTICAL IGFET WITH INTERNAL GATE AND METHOD FOR MAKING SAME

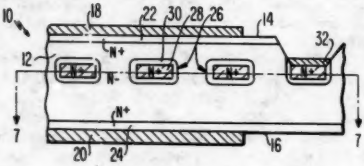
Scott C. Blackstone, Mount Prospect, Ill.; Lubomir L. Jastrzebski, Plainsboro, and John F. Corboy, Jr., Ringoes, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Division of Ser. No. 439,563, Nov. 5, 1982. This application Jun. 26, 1985, Ser. No. 748,940

Claims priority, application United Kingdom, Jun. 24, 1982, 8218283

Int. Cl.⁴ H01L *21/74, 21/78, 21/80, 29/94*

U.S. Cl. 29—571 **3 Claims**



1. A method for fabricating a vertical IGFET, comprising:

providing a monocrystalline silicon substrate having first and second opposing major surfaces;

forming a first oxide layer across the first surface;

forming a pattern of doped polycrystalline silicon on the oxide layer;

forming a second oxide layer on all exposed portions of the polycrystalline silicon so as to form an insulated gate;

removing the first oxide layer from the first substrate surface in areas not covered by the insulated gate;

depositing epitaxial silicon on the first substrate surface and the insulated gate, and terminating said epitaxial deposition after a surface which is substantially parallel to the first surface is formed; and

providing source, drain and gate electrodes in ohmic contact with the epitaxial silicon surface, the second substrate surface, and the polycrystalline silicon, respectively.

4,586,241

PHOTOELECTRIC CONVERSION DEVICE MANUFACTURING METHOD

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Tokyo, Japan

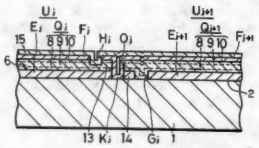
Division of Ser. No. 554,762, Nov. 23, 1983, Pat. No. 4,529,829. This application Jun. 13, 1984, Ser. No. 620,098

Claims priority, application Japan, Nov. 24, 1982, 57-206806; Nov. 24, 1982, 57-206809; Feb. 22, 1983, 57-28211; Apr. 29, 1983, 57-75713; Oct. 31, 1983, 58-204443

The portion of the term of this patent subsequent to Jul. 9, 2002, has been disclaimed.

Int. Cl.⁴ H01L *31/18, 27/14*

U.S. Cl. 29—572 **17 Claims**



1. A method of making a photoelectric conversion device in which a plurality n (where n is an integer larger than 2) of semiconductor elements U_1 to U_n are sequentially formed side by side on a substrate having an insulating surface and connected in series one after another, the semiconductor element U_i (i=1, 2, . . . n) comprising a first electrode E_i on the substrate, a non-single-crystal semiconductor laminate member Q_i on the first electrode E_i and a second electrode F_i on the non-single-crystal semiconductor laminate member Q_i, the second electrode F_{j+1} (j=1, 2, . . . (n−1)) being connected via coupling portion K_j to the first electrode E_j, comprising the steps of:

forming on the substrate a first conductive layer comprising a first conductive metal oxide layer;

forming (n−1) sequentially arranged first grooves G_1 to G_{n-1} in the first conductive layer by using a first laser beam to form therein n sequentially arranged first electrodes E_1 to E_n separated by the first grooves G_1 to G_{n-1}, respectively;

forming on the substrate a non-single-crystal semiconductor laminate layer having formed therein at least one semiconductor junction and covering the first grooves G_1 to G_{n-1} and the first electrodes E_1 to E_n;

forming (n−1) sequentially arranged grooves O_1 to O_{n-1} in the non-single-crystal semiconductor laminate layer by using a second laser beam to form n sequentially arranged non-single-crystal semiconductor laminate members Q_1 to Q_n extending on the first electrode E_1 to E_n, respectively, and to expose portions of the first electrodes E_1 to E_{n-1} to the outside through the grooves O_1 to O_{n-1}, respectively;

following the formation of the second grooves O_1 to O_{n-1} with a deburring or an etch using a gas or a liquid comprising hydrofluoric acid, hydrochloric acid, or Freon liquid;

forming a second conductive layer which is a laminate member comprising a second conductive metal oxide layer and which continuously extends on the non-single-crystal semiconductor laminate members Q_1 to Q_n and extends

into the grooves O_1 to O_{n-1} to provide coupling portions K_1 to K_{n-1} which are connected to the first electrodes E_1 to E_{n-1} through the grooves O_1 to O_{n-1}, respectively; and

forming (n−1) sequentially arranged isolating portions H_1 to H_{n-1} in at least the second conductive layer to form n sequentially arranged second electrodes F_1 to F_n separated by the isolating portions H_1 to H_{n-1} and opposing the first electrodes E_1 to E_{-1} through the isolating portions H_1 to H_{n-1}, respectively, the second electrode F_{j+1} being connected to the first electrode E_j through the coupling portion K_j by the contact between the second conductive metal oxide layer of the coupling portion K_j and the first conductive metal oxide layer of the first electrode E_j.

4,586,242

OPERATIONS ON A SEMICONDUCTOR INTEGRATED CIRCUIT HAVING TWO KINDS OF BUFFERS

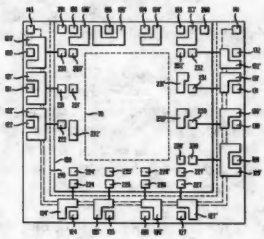
Marc L. Harrison, Morganville, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 381,187, May 24, 1982, Pat. No. 4,488,267. This application Oct. 15, 1984, Ser. No. 661,133

The portion of the term of this patent subsequent to Dec. 11, 2001, has been disclosed.

Int. Cl.[4] H01L *21/90, 21/66*

U.S. Cl. 29—574 **7 Claims**



1. The method of forming a semiconductor integrated circuit chip portion comprising the steps of:

(a) providing a larger integrated circuit chip of which the chip circuit portion is a part, the chip portion comprising a first plurality of first bonding pads each of which is separately connected to a separate buffer of a first kind that operates with a first supply voltage, the larger chip exclusive of the chip portion comprising a second plurality of second bonding pads each of which is separately connected to a separate buffer of a second kind that operates with a second supply voltage different from the first voltage, each buffer of the second kind being separately connected via a separate electrically conductive path to a separate corresponding one of the first bonding pads, the chip portion being capable of performing first electrical operations in response to first signals applied to the first bonding pads and being capable of performing second operations in response to second signals applied to the second bonding pads;

(b) performing at least one of the second operations by applying the second signals to the second bonding pads; and

(c) disconnecting at least one of the buffers of the second kind from its corresponding one of the first pads by physically severing the corresponding electrically conductive path.

6. The method of claim **1** in which the first operation is a normal micropessor operation and the second operation is a test operation.

4,586,243

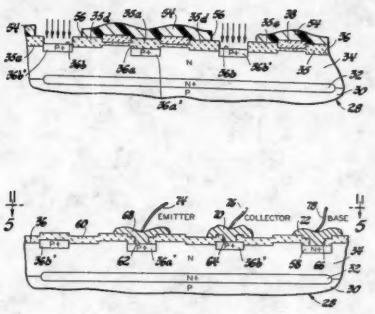
METHOD FOR MORE UNIFORMLY SPACING FEATURES IN A SEMICONDUCTOR MONOLITHIC INTEGRATED CIRCUIT

John R. Weaver, II, and Nathaniel D. McClure, both of Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 458,166, Jan. 14, 1983, Pat. No. 4,544,940. This application Nov. 19, 1984, Ser. No. 672,994

Int. Cl.[4] H01L *21/265, 21/26;* B05D *3/06*

U.S. Cl. 29—578 **7 Claims**



1. A photolithographic method of more predictably and uniformly spacing features on a surface of a semiconductor device comprising:

masking a semiconductor surface to delineate an adjacent pair of surface areas in which boundaries of one area are negatively defined and boundaries of the other feature are positively defined, effective to separate the so-defined surface areas by both negatively and positively defined surface areas therebetween;

forming a surface feature on one of the aforesaid pair of surface areas masking while retaining the aforesaid definition of the other surface area and also retaining the aforesaid dual definition of separation therebetween; and

forming a surface feature on the other of the aforesaid pair of surface areas, while still retaining a dual definition of separation therebetween;

whereby the two surface features can be predictably and uniformly spaced as formed, regardless of swelling or shrinkage in photoresist used to delineate the boundaries of the aforesaid surface areas or in successively forming the aforesaid surface features.

4,586,244

METHOD AND APPARATUS FOR ASSEMBLING A ROTATABLE MACHINE AND A METHOD FOR OPERATING THE APPARATUS

Alexander Muller, Holland, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Continuation-in-part of Ser. No. 593,840, Mar. 27, 1984. This application Jun. 1, 1984, Ser. No. 616,200

Int. Cl.[4] H02K *15/02*

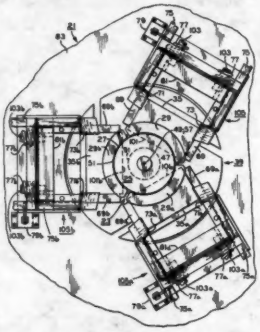
U.S. Cl. 29—598 **28 Claims**

7. A method of operating apparatus for assembling a rotatable assembly adapted for use in a dynamoelectric machine, the rotatable assembly including at least one rotatable member having a circumferential surface, and a set of magnet material elements having generally arcuate inner and outer surfaces, respectively, and the apparatus including a set of means adapted for receiving the magnet material elements, a set of cam followers associated with the receiving means, and camming means adapted for selective actuation and having a set of cams thereon, respectively, the method comprising the steps of:

placing the at least one rotatable member in a preselected position with respect to the receiving means, respectively;

receiving the magnet material elements in the receiving means and adjusting the magnet material elements into preselected positions therefor on the receiving means, respectively;

effecting the selective actuation of the camming means and drivingly engaging thereby the cams thereof with the cam followers of the receiving means, respectively; and



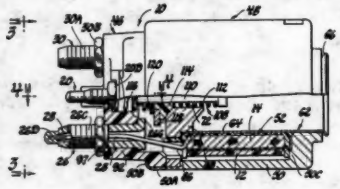
camming the receiving means generally conjointly into assembly positions therefor with respect to the at least one rotatable member in its preselected position in response to the effecting and drivingly engaging step and placing the arcuate inner surfaces of the magnet material elements in the preselected positions thereof on the receiving means within a preselected spatial range from the circumferential surface of the at least one rotatable member upon the camming of the receiving means into the assembly positions thereof, respectively.

4,586,245

SOLENOID COIL WIRE TERMINATION

Ross A. Gresley; Howard E. Leech, both of Anderson, and Alan L. Smock, Dubois, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 614,753, May 29, 1984, Pat. No. 4,540,962.
This application Apr. 12, 1985, Ser. No. 722,704
Int. Cl.[4] H01F *7/06*
U.S. Cl. 29—602 R **5 Claims**



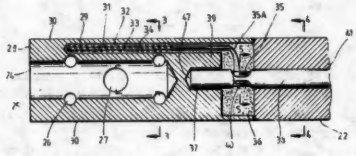
1. A method of manufacturing a solenoid that has at least one coil winding located within housing means and which has an end cover member formed of electrical insulating material that carries a metallic electrical terminal that extends through the cover member, the terminal having an axially extending internal bore that initially extends entirely through the terminal, the steps comprising positioning the end lead wire of said coil winding such that it extends generally axially of said housing means, moving the cover member and housing means into engagement with each other and inserting the end lead wire into said coil winding into the bore of the terminal by said movement, securing said cover member to said housing means, radially deforming an end portion of said terminal that is located externally of said cover member into engagement with said end lead wire, and then welding the end of the deformed terminal portion to the end of said end lead wire such that the welded end of said terminal is completely closed.

4,586,246

METHOD FOR ASSEMBLING RESISTANCE TEMPERATURE DETECTOR

Rayyaneh M. Oskoui, Round Rock, Tex., assignor to Weed Instruments Co., Inc., Round Rock, Tex.

Filed Feb. 29, 1984, Ser. No. 584,714
Int. Cl.[4] H01C *7/02*
U.S. Cl. 29—612 **13 Claims**



1. A method for assembling an instrument having at least one receiving cavity to receive an insertion element, the method comprising the steps of:

(a) providing a guide cavity in the instrument;

(b) providing a generally rigid stalk having a tip and an extension end and at least one longitudinal bore of sufficient diameter to permit a lead to be threaded therethrough;

(c) forming an opening on the surface of the stalk at a location spaced sufficiently from the tip to form a barrier wall between the opening and the tip, and to a depth sufficient to place the opening in communication with at least one of the longitudinal bores so as to allow passage of lead wires therethrough while leaving a sufficient portion of the stalk to support the barrier wall during assembly and subsequent operation of the instrument;

(d) threading the lead through at least one longitudinal bore in the stock and the opening to expose the terminus of the lead by extending the terminus from the opening;

(e) attaching the terminus of the lead to the insertion element to form a junction between the terminus of the lead and the insertion element;

(f) inserting the insertion element into the receiving cavity by bringing the tip of the stalk into the guide cavity while initially maintaining the position of the insertion element with respect to the stalk; and

(g) thereafter securing the insertion element in the receiving cavity.

4,586,247

APPARATUS FOR INSERTING ELECTRONIC ELEMENTS

Toshiaki Murai; Takeshi Kawana, and Toshio Asano, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

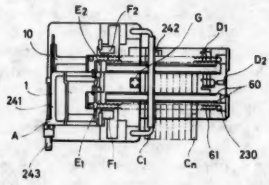
Filed Aug. 13, 1984, Ser. No. 639,934
Claims priority, application Japan, Aug. 12, 1983, 58-146451
Int. Cl.[4] B23P *21/00, 19/00;* B23Q *15/00*
U.S. Cl. 29—705 **10 Claims**

1. An apparatus for inserting a plurality of differently shaped electronic elements into a corresponding plurality of different holes at different locations throughout a circuit board, with the holes arranged on the circuit board generally in an x-y plane, comprising:

a board positioning means for sequentially receiving boards fed to it, said board positioning means automatically positioning each of said holes of a board at a fixed insertion position according to a predetermined order by moving said board in both the x and y directions of said plane;

element supply means having a plurality of element supply units each adapted to feed to a respective fixed element supply position an electronic element to be inserted in said board;

said element supply units being arranged such that there element supply positions are placed in a rectilinear row parallel to said plane;



a plurality of chucks differently formed in shape corresponding to the differently shaped electronic elements supplied by said plurality of element supply units;

an inserting head having holder means for detachably supporting any one of said chucks selectively;

drive means to reciprocate said inserting head in a straight line between a supply position, fixed chuck exchanging position and said insertion position.

4,586,248

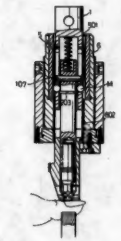
SAFETY DEVICE FOR ARBOR OF FASTENING MACHINE

Kwang-Liang Ho, 27, Nan Yang Road, Feng Yuan, Taichung Hsien, Taiwan (420)

Filed Sep. 20, 1984, Ser. No. 652,514

Int. Cl.[4] B23Q *11/00*

U.S. Cl. 29—708 **5 Claims**



1. A safety device for an arbor of a fastening machine press having upper and lower molds and a dynamic power source, comprising:

(a) a main body;

(b) a first, steel sleeve attached to the main body, the first sleeve defining a first quadrangular slot, having a first lateral dimensin, extending along a longitudinal axis of the first sleeve;

(c) a second, copper sleeve defining a second quadrangular slot, having a second lateral dimension, and located such that the first and second quadrangular slots are coaxial;

(d) a hollow drive sleeve slidably located in the quadrangular slots, the drive sleeve defining a plurality of elongated holes and a plurality of square holes evenly spaced about its circumference;

(e) means to attach the drive sleeve to the dynamic power source such that it reciprocates in the quadrangular slot;

(f) an upper mold mandrel having the upper mold attached to one end and extending into the hollow drive sleeve, the mandrel having an outwardly extending flange ring thereon;

(g) pin means extending transversely through the upper mold mandrel and into the plurality of elongated holes in the drive sleeve; and

(h) a roller disposed in each of the square holes in the drive sleeve such that they roll within the quadrangular slot and normally bear against the flange ring to exert a forming force on the upper mold mandrel, the dimensions of the first and second quadrangular slot being such that the rollers may be displaced outwardly to pass over the flange ring without exerting a forming force on the upper mold mandrel should there be an undersired object between the upper and lower molds.

4,586,249

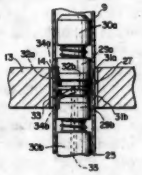
MANDREL HAVING AN EDDY CURRENT PROBE

Annette M. Costlow, Plum Borough; David A. Chizmar, Export, and Frank W. Cooper, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 30, 1983, Ser. No. 567,107

Int. Cl.[4] B23P *19/00, 17/00;* **G01B** *7/14*

U.S. Cl. 29—723 **6 Claims**



1. A combination apparatus comprising an elongated mandrel having a head member portion and an attached elongated eddy-current probe for accurately locating the head member portion of said mandrel in a predetermined position axially within a tube at which position the tube is surrounded by a closely spaced metallic structure and for then applying a radially expansive fluid force within the tube at the determined axial position of the head member portion of said mandrel to expand the proximate portion of said tube against the surrounding metallic structure, said combination apparatus comprising:

said mandrel comprising an elongated body member conformed to slidably interfit into the tube to be processed, said mandrel having a top portion and a bottom portion, said head member portion of said mandrel located intermediate the ends of said mandrel, said head member portion recessed from the exterior surface of said mandrel and having a centrally disposed ledge member bounded on either side by O-ring-receiving recesses, annular ramps extending from said O-ring-receiving recesses toward the surface of said mandrel, a pair of O-rings retained within said O-ring-receiving recesses, a fluid pressure conduit within the body of said mandrel and extending from the bottom portion of said mandrel and opening into the central portion of said head member portion, sleeve members positioned on either side of said head member portion, spring members urging said sleeve members toward said head member portion, and stop members on said mandrel to limit the motion of said sleeve members away from said head member portion;

said eddy-current probe comprising an elongated body member conformed to slidably interfit into said tube to be processed, said probe body member removably affixed at one end portion thereof to the bottom of said mandrel, eddy current sensing coils carried on said body member of said eddy-current probe, electrical lead-ins extending from said coils to provide for an operator an indicia of the

location of said metallic structure, the distance from said coils to said head member portion being known so that once said metallic structure is located by said eddy-current probe said head member portion can be positioned within the tube being processed proximate said metallic structure, a fluid pressure conduit within the body of said eddy-current probe and connecting with the fluid pressure conduit within said mandrel member, and an elongated fluid pressure conduit connecting a fluid pressure generating apparatus exterior of said tube to said fluid pressure conduit within said eddy-current probe;

in operation of said apparatus said metallic structure is first located by moving said eddy-current probe within said tube being processed until said metallic structure is accurately located, said mandrel is then backed down to the position said head member portion thereof proximate said metallic structure, fluid at controlled pressure is then applied through said fluid pressure conduits to generate controlled fluid pressures between said head member portion and said tube being processed with said O-rings confining the pressurized fluid, increasing fluid pressures within said head member position causing said O-rings to move apart and maintain a seal with said tube being processed and then to elastically deform said tube being processed, increasing fluid pressures within said head member portion then moving said O-rings against said sleeve members to force said sleeve members apart against the force of said spring members until said sleeve members abut against said stop members, and further controlled increases in the fluid pressures within said head member portion causing the tube being processed to abut against said metallic structure and to plastically deform; and

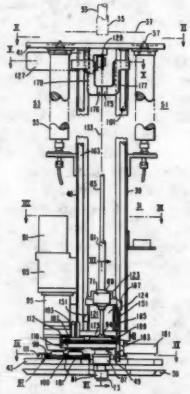
after predetermined plastic deformation of said tube has been achieved said fluid pressure is removed, and upon removal of said fluid pressure said spring members move said sleeve members toward said head member portion to move said O-rings into said O-ring-receiving recesses to permit said mandrel to be readily removed from said now-processed tube.

4,586,250

APPARATUS FOR SLEEVING TUBES IN HOSTILE ENVIRONMENTS

Frank W. Cooper, Jr., Monroeville, and John P. Vogeleer, Greensburg, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 3, 1983, Ser. No. 538,320
Int. Cl.[4] B23P *15/26, 19/00*
U.S. Cl. 29—727 **22 Claims**



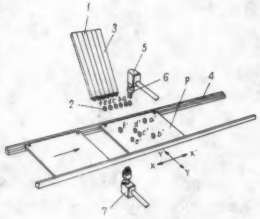
1. A remotely-actuable apparatus for rolling a selected region of a sleeve of a corroded or damaged coolant conductor housed within the radioactive environment of a steam generator of a nuclear-reactor power plant; the said apparatus including a tube having therein transversely extensible and retractable roller means; remotely-actuable means, connected to said tube for moving said tube into and out of said sleeve; a mandrel; remotely-actuable means, connected to said mandrel, for advancing said mandrel relative to said tube into, and retracting said mandrel from, said tube, said advancing-and-retracting means being set in the standby condition of said apparatus with said mandrel retracted from said tube; remote-actuable means, connected to said tube and mandrel, for locking said apparatus with said tube and mandrel in position to roll said sleeve without the necessity that the apparatus be held by personnel during the rolling operation; remotely-actuable means, connected to said advancing-and-retracting means and responsive to the positioning of said tube, by inward movement by said moving means, with said roller means at the level of said selected region of said sleeve, for advancing said mandrel into said tube, said mandrel being dimensioned to extend said roller means into engagement with said sleeve as said mandrel advances into said tube; remotely-actuable means, connected to said mandrel, for rotating said mandrel in driving engagement with said roller means to rotate said roller means in rolling engagement with said sleeve; and remotely-actuable means, connected to said tube and mandrel, for retracting said tube and said mandrel after predetermined rolling of said selected region of said sleeve.

4,586,251

APPARATUS FOR MOUNTING ELECTRIC PARTS

Hiromi Kinoshita, Katano; Kouji Fujiwara, Yamato Kouriyama, and Yoshinobu Maeda, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP82/00207, § 371 Date Feb. 1, 1983, § 102(e) Date Feb. 1, 1983, PCT Pub. No. WO82/04374, PCT Pub. Date Dec. 9, 1982
Continuation of Ser. No. 468,799, Feb. 1, 1983, abandoned. This PCT application May 28, 1982, Ser. No. 713,581
Claims priority, application Japan, Jun. 1, 1981, 56-84690
Int. Cl.[4] H05K *3/30*
U.S. Cl. 29—741 **5 Claims**



1. In an apparatus for mounting electric parts on a circuit board and of the type including a part supply section fixed to a base for supplying electric parts successively to a part supply position, a printed circuit board transfer section for supporting and transferring a printed circuit board, and a part mounting section for transferring parts between said part supply position and the printed circuit board, the improvement wherein:

said part mounting section is positioned at a side of said printed circuit board transfer section opposite to a side thereof whereat said part supply section is positioned; and

said part mounting section comprises a frame slidably mounted on a pair of horizontal guide shafts extending parallel to the printed circuit board transfer direction of said printed circuit board transfer section, upper and lower guide shafts respectively disposed at upper and

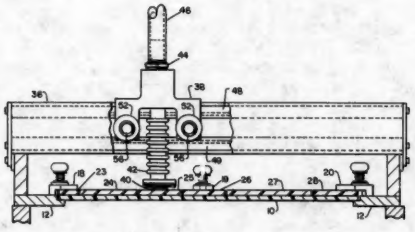
lower portions of said frame so that they are slidable with said frame along said horizontal guide shafts and extend at right angles to said horizontal guide shafts with said horizontal guide shafts positioned between said upper and lower guide shafts, a connecting frame connecting said upper and lower guide shafts, a part mounting head mounted on said upper guide shaft, an anvil head mounted on said lower guide shaft, with said printed circuit board transfer section being positioned between said heads, a first motor for moving said frame along said horizontal guide shafts, and a second motor for moving said upper and lower guide shafts along said frame, said part mounting head comprising a chuck device for grasping electric parts, a shaft supporting said chuck device in a vertically movable and rotatable manner, a means to move said shaft vertically by compressed air, a means to rotate said shaft by compressed air, and a stop means to stop said shaft at a desired rotational position.

4,586,252

TOOL FOR REMOVING SOLDERED COMPONENTS

Robert L. Faticanti, Dracut, Mass., assignor to Avco Corporation, Wilmington, Mass.

Filed Feb. 15, 1985, Ser. No. 702,222
Int. Cl.[4] H05K *3/00*
U.S. Cl. 29—762 **4 Claims**



1. A tool for removing a faulty component from a printed circuit board when said component has a plurality of input-/output pins that protrude through holes in said board and are soldered to printed circuits on the underside thereof, said tool comprising:

masking means for covering the bottom surface of said printed circuit board except for that area spanning the pins of the faulty component;

a fixture including a container for molten solder together with aligning and retaining means for supporting said printed circuit board over the surface of molten solder so as to bring the tips of said plurality of input/output pins into contact therewith where said pins protrude through said printed circuit board;

a beam supported at its ends and positioned parallel to and above the top surface of said printed circuit board, at least one position along said beam being directly over the area where said faulty component attaches to said printed circuit board;

a trolley movable along said beam to a position directly above said faulty component;

a vacuum pumping source; and

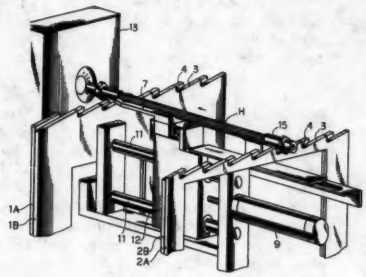
vacuum lifting means depending from said trolley and in communication with said vacuum pumping source for contacting and raising said faulty component free from said printed circuit board when the soldered connections holding the plurality of input/output pins to said printed circuits melt, said vacuum lifting means including a tubular bellows having on its lower end a suction cup for making contact with said faulty component for accomplishing the lifting function, the cross sectional area of said suction cup being sized to control the magnitude of the component raising force.

4,586,253

APPARATUS FOR CONVEYING ELONGATED OBJECTS

Toshiyuki Souchi; Hisanori Fujiyama, both of Inazawa, and Mitsuo Hagi, Ichinomiya, all of Japan, assignors to Toyoda Gosei Co., Ltd., Ichinomiya, Japan

Division of Ser. No. 480,275, Mar. 30, 1983, abandoned. This application Mar. 19, 1985, Ser. No. 713,587
Claims priority, application Japan, Apr. 1, 1982, 57-54474
Int. Cl.[4] B23P *19/00*
U.S. Cl. 29—796 **1 Claim**



1. Apparatus for caulking metal fittings onto both ends of each of a transversely arranged succession of lengths of hose, each having a metal fitting received thereon so that an externally cylindrical sleeve of the fitting is juxtaposed axially inwardly of a radially outwardly projecting circumferential flange of the fitting, said apparatus comprising:

at least two pairs of vertically disposed plate members, said pairs being so spaced apart from each other as to support the cylindrical sleeves of the metal fittings at both ends of said lengths of hose thereon, said plate members in each of said pairs being placed one upon the other, and alternately vertically movable for conveying said lengths of hose with fittings assembled thereon transversely, each of said plate members having a corrugated upper edge defined by a plurality of alternately occurring crests and roots, said crests on said upper edge of one of said plate members in each of said pairs being in staggered relation to said crests on the other plate member by a distance which is equal to a half of the pitch between said crests;

said crests and roots defining a plurality of alternately occurring inclined flanks and substantially vertical flanks, said inclined flanks enabling said lengths of hose with fittings assembled thereon to move down into said roots, said vertical flanks serving as a stop for said lengths of hose with fittings assembled thereon;

at a first caulking station disposed intermediate the longitudinal extent of said pairs of plate members, there being provided transversely to one outer side of said pairs of plate members a first caulking device constructed and arranged for caulking the sleeves of a succession of said metal fittings assembled on a succession of respective one ends of respective ones of said lengths of hose, said first caulking device being directed transversely inwardly of said pairs of plate members;

a first receiving member provided between said pairs of plate members at said first caulking station for successively receiving each of said lengths of hose with fittings assembled thereon and moving it longitudinally, temporarily, by an amount sufficient to place a said fitting assembled on one end of a respective said length of hose received on sad receiving member within operational reach of said first caulking device for caulking of the respective

sleeve of the respective fitting into said one end of said respective length of hose, said first receiving member being situated above said upper edges of said plate members in their lowered position, and at a level of height which is equal to the level of said roots of any of said plate members in its raised position;

at a second caulking station disposed intermediate the longitudinal extent of said pairs of plate members further along said longitudinal extent than said first caulking station, there being provided transversely to the opposite outer side of said pairs of plate members from said one other side a second caulking device constructed and arranged for caulking the sleeves of a succession of said metal fittings assembled on a succession of respective other ends of respective ones of said lengths of hose, said second caulking device being directed transversely inwardly of said pairs of plate members;

A second receiving member provided between said pairs of plate members at said second caulking station for successively receiving each of said lengths of hose with fittings assembled thereon and moving it longitudinally, temporarily, by an amount sufficient to place a said fitting assembled on a said other end of a respective said length of hose received on said receiving member within operational reach of said second caulking device for caulking of the respective sleeve of the respective fitting onto said other end of said respective length of hose, said second receiving member being situated above said upper edges of said plate members in their lowered position, and at a level of height which is equal to the level of said roots of any of said plate members in its raised position; and

means for reciprocatingly moving each of said pairs of plate members vertically accordingly to a cyclic pattern in which at one time at least one of said pairs is fully raised when at least another of said pairs is still lowered, at another time said at least one pair is fully lowered when said at least one other pair is fully raised, and at a further time all of said pairs are fully lowered.

4,586,254

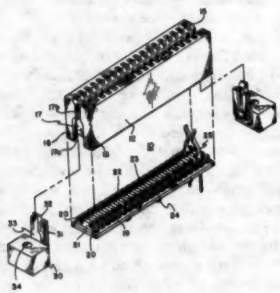
METHOD OF MAKING A MODULAR CONNECTOR

J. Preston Ammon; Jerry A. Kendall, both of Dallas, and John D. Martens, Carrollton, all of Tex., assignors to Elfab Corp., Lewisville, Tex.

Division of Ser. No. 520,868, Aug. 5, 1983, abandoned. This application Jan. 22, 1985, Ser. No. 693,637

Int. Cl.[4] H01R *43/16*

U.S. Cl. 29—884 **4 Claims**



1. A method of making a connector to a desired length from modular parts including a connector body having a plurality of identical compartments formed by transverse walls within the connector body, a bottom plate, two end caps and a plurality of terminals, comprising the steps of; cutting the connector body adjacent to one of the transverse walls to provide a connector body of the desired length and milling a slot in the cut end of the connector body, joining an end cap to each end of the connector body, and joining the bottom plate to the connector body, the bottom plate having a plurality of terminals extending through the bottom plate so that one end of each terminal is positioned within the connector body, and joining an end cap to each end of the connector body.

4,586,255

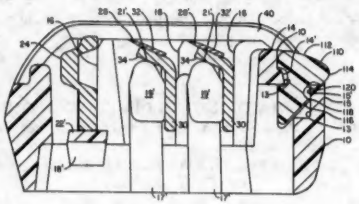
RAZOR BLADE ASSEMBLY

Chester F. Jacobson, Southboro, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Oct. 15, 1984, Ser. No. 660,954

Int. Cl.[4] B26B *21/44*

U.S. Cl. 30—41 **2 Claims**



1. A razor blade assembly comprising a body member of molded plastic including a front portion and a back portion, a guard member mounted on said body member, blade means mounted on said body member rearwardly of said guard, the back portion of said body member having an upper surface portion and a rear surface portion, said back portion having an opening therein, said opening being defined in part by a rear portion of said back portion and the upper surface of said back portion, said back portion rear surface and the upper surface portion of said back portion being angularly offset relative to one another and an insert member fixed in said opening, said insert member including a wedge-shaped portion and said opening being in part defined by a gap between said back portion upper surface and said back portion rear surface portion, said wedge-shaped portion at its widest point being wider than said gap, but adapted to be urged through said gap, in assembly, to become permanently lodged in said opening and in which said insert member is comprised of a mixture of hydrophobic material and a water leachable hydrophilic polymeric material.

4,586,256

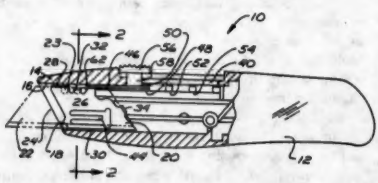
KNIFE HANDLE

George F. Weimann, Avon, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Jan. 7, 1985, Ser. No. 689,296

Int. Cl.[4] B26B *1/08*

U.S. Cl. 30—162 **12 Claims**



1. A knife handle comprising:

an elongated case having a forward blade opening and interi-

orly forming a pair of spaced guide means, and a blade carrier adapted for mounting a blade and slidably received in said guide means for selective longitudinal movement therealong between a retracted sheathed position and an extended unsheathed position wherein a blade mounted to said carrier extends through said blade opening to present a cutting edge, said blade carrier including a planar blade supporting portion, retainer means projecting laterally away from said blade supporting portion to removably transversely retain a mounted blade by engaging opposing peripheral edges of said blade and tab means to capture a mounted blade for lateral retention thereof in cooperation with said blade supporting portion by engagement of a portion of said blade adjacent one said opposing blade edge.

4,586,257

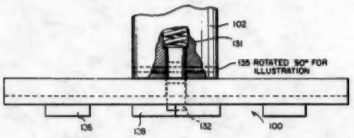
RELEASABLE BLADE, BLADE HOLDER AND BLADE-HOLDER COMBINATION

James L. Rittenhouse, 5115 Benner Rd., Clayton, Mich. 49235

Filed Mar. 13, 1984, Ser. No. 589,143

Int. Cl.[4] B26B *7/00*

U.S. Cl. 30—276 **9 Claims**



1. An elongated cutting blade comprising:

(a) upper and lower surfaces terminating at opposite ends;

(b) a hole through said surface in the center of an attachment portion of said blade about which said cutting blade is balanced for rotation; and

(c) longitudinal opposite edges along said surfaces, each of said edges having in said blade attachment portion, two or more notches extending inwardly from said edges and providing one or more tabs on each of said edges, and on each of said longitudinal opposite edges, a sharpened portion extending oppositely from said blade attachment portion toward said opposite ends.

4. A holder for releasably securing an elongated bar to a drive means, said holder comprising:

(a) a holder body adapted to be connected to said drive means and having a substantially flat outer face;

(b) an engaging means biased outwardly from said flat outer face to engage a hole in said bar; and

(c) two guide grooves formed along the longitudinal side edges of said flat outer face with opposing peripheral walls projecting outwardly from said flat outer face at the respective longitudinal sides thereof and at right angles thereto, and two or more lip tabs protruding inwardly from each of said peripheral walls at a right angle thereto and substantially parallel to said flat outer face,

said lip tabs being interspaced along the length of said walls providing one or more lip notches along said walls.

4,586,258

AXE

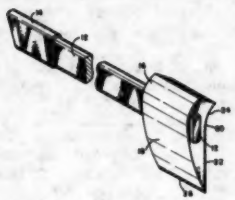
Edward R. Burke, P.O. Box 235, Lima, Pa. 19037

Filed May 7, 1984, Ser. No. 607,799

Int. Cl.[4] B26B *23/00*

U.S. Cl. 30—308.1 **7 Claims**

1. A wood splitting axe mounted on an axe handle comprising: an elongated axe head having two side faces, an inner face, and an outer face, said inner and outer faces extending to opposite sides of the axe handle and converging to form a cutting edge, said head having a hole therein for receiving the axe handle and having its center line substantially parallel to said cutting edge, said outer face being entirely convex shaped, said inner face having at least a portion thereof including a



concave portion, and at least part of said concave portion of said inner face extending beyond the handle location on the axe head and being located opposite said cutting edge.

4,586,259

OUTPUT ROTATIONAL ANGLE INDICATING DEVICE OF ROCKING ROTATIONAL ANGLE ALTERING SYSTEM

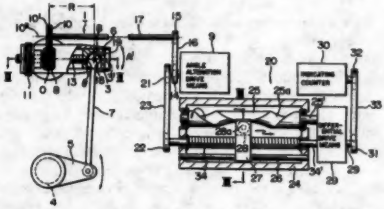
Heizaburo Kato, Shizuoka, Japan, assignor to Sankyo Manufacturing Company, Ltd., Tokyo, Japan

Filed Jan. 24, 1985, Ser. No. 694,369

Claims priority, application Japan, Mar. 15, 1984, 59-36858[U]

Int. Cl.[4] F16H *21/44*

U.S. Cl. 33—1 PT **1 Claim**



1. In a rocking rotational angle altering system comprising a first oscillating arm connected to an input shaft, a second oscillating arm connected to an output shaft, a connecting rod connecting the first oscillating arm and second oscillating arm together, and angle alteration drive means for moving a portion of the connecting rod connected to the first oscillating arm axially of the first oscillating arm a distance proportional to the magnitude of rotation of the angle alteration drive means, to thereby vary the angle of rocking rotation of the output shaft with respect to the angle of rocking rotation of the input shaft, an output rotational angle indicating device comprising:

a threaded rod connected to said angle alteration drive means for rotation for a magnitude corresponding to the magnitude of rotation of the angle alteration drive means;

a movable block threadably connected to said threaded rod for movement axially thereof when it rotates, said movable block having rolling elements mounted therein to act as a unit therewith;

a cam rod disposed parallel to said threaded rod and formed with a flat cam surface engaging said rolling elements, said cam surface being profiled such that the cam rod is caused to rotate for a magnitude corresponding to the difference between the magnitude of an actual change in the angle of rocking rotation of the output shaft produced when the threaded rod is rotated and the magnitude of a change in the rocking angle showing approximately linearly the relation between the magnitude of rotation of the threaded

rod and the magnitude of the change in the angle of rocking rotation of the output shaft;

differential drive means producing a rotational output corresponding to the magnitude of the actual change in the angle of rocking rotation of the output shaft based on the rotation of the threaded rod and the rotation of the cam rod; and

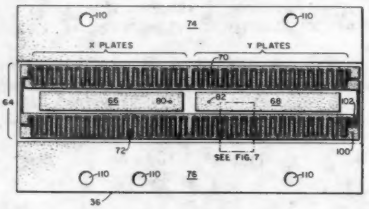
indicating means for indicating an angle of rocking rotation corresponding to the rotational output of said differential drive means.

4,586,260

CAPACITIVE DISPLACEMENT MEASURING INSTRUMENT

Larry K. Baxter, Carlisle, and Robert J. Buehler, Tewksbury, both of Mass., assignors to The L. S. Starrett Company, Athol, Mass.

Filed May 29, 1984, Ser. No. 614,818
Int. Cl.[4] G01B 7/02
U.S. Cl. 33—125 C **22 Claims**



1. A capacitive displacement transducer, comprising

a scale member bearing a transducer surface,

a slider member bearing a transducer surface,

means for mounting said members for relative movement over a displacement interval throughout which said transducer surfaces are in predetermined spaced opposition,

a pattern of spaced elongated conductive elements fixed on said transducer surface on said scale member extending over said displacement interval arranged transversely to the direction of relative movement between said members,

a pattern of conductive elements fixed on said transducer surface of said slider member including two elongated coupling electrodes in spaced alignment parallel to the direction of movement opposite said elements on said scale member, and at least one array composed of two interdigitated sets of transmitter electrodes arranged parallel to said coupling electrodes, said array being divided lengthwise into two parts in space quadrature with each other at least coextensive respectively with said coupling electrodes in the direction of the length of said coupling electrodes,

means for furnishing electrical connections to said slider electrodes including means for electrically connecting said transmitter electrodes, respectively, in an external circuit and means for electrically connecting said two coupling electrodes respectively in an external circuit.

4,586,261

UNIVERSAL DIMENSIONAL GAUGE TABLE FOR INNER AND OUTER MEASURES

René Beaupère, Montbrison, France, assignor to Beaupere S.a.r.l., Z.I. des Granges, Montbrison, France

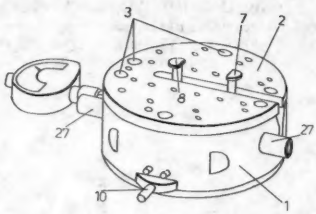
Filed Dec. 27, 1983, Ser. No. 565,694
Claims priority, application France, Dec. 31, 1982, 82 22240; Apr. 19, 1983, 83 06349
Int. Cl.[4] G01B 5/12
U.S. Cl. 33—147 E **17 Claims**

1. A universal dimensional gauge table for comparatively measuring inner and outer dimensions against a predetermined calibrated, verification of a dimension of a part between a fixed key and a mobile key, comprising:

a body housing a horizontally extensive slide,

a support for centering said fixed key within said slide, the lower part of the support having a cross-section in a shape of an inverted isoceles trapezium and lying in said slide of the body, said slide having a recessed cross-section corresponding to the cross-section of the support;

a key wedge for locking the support of the fixed key within said slide, said key wedge having a cylindrical shape with a longitudinal flat part, said support being crossed through by a bore within which is supported said key wedge, and a screw causing said flat part to pivot about its longitudinal axis in said bore by the action of said screw pressing against one side of said flat part, with another side of said flat part being wedged against a lower face of the gauge table;



a square shaped support for supporting said mobile key, the former having a first pin fixed thereto, the body of the gauge table being provided with a second pin, said second pin being parallel to said first pin, a first bearing means carried in the square shaped support with said first bearing means being supported by said second pin, a second and a third bearing means in the body of the gauge table with said second and third bearings means supporting the first pin, whereby the square shaped support, the first pin and the second pin form an assembly for displacing the mobile key toward and away from said fixed key, and providing substantial perpendicularity between the vertical extent of said mobile key and said gauge table and a substantial centering of the mobile key relative to said slide; and wherein two protecting caps are further provided in the body of the gauge table for protecting the first pin at the two ends thereof.

4,586,262

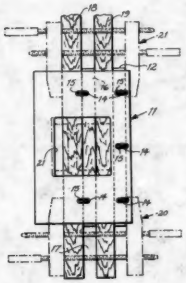
DOOR HINGE DUPLICATING TEMPLATE

Jack F. Back, E. 627 Empire Ave., Spokane, Wash. 99207

Filed Aug. 27, 1984, Ser. No. 644,791
Int. Cl.[4] B27G 17/08
U.S. Cl. 33—197 **1 Claim**

1. A door hinge duplicating template, comprising, in combination, a face plate, a stationary spacer block secured to a bottom surface of said face plate, and a floating spacer block also securable to said face plate bottom surface, a plurality of elongated openings through said face plate receiving screw fasteners screwed in both said spacer blocks, a space between said stationary spacer block and said floating spacer block for a new door being positioned therebetween, a large square opening through said face plate to route out an accurate space for fitting a hinge, a pair of insert plates inserted one at a time in said large square opening, each of said insert plates comprising a main body portion and a pair of spaced apart legs extending from said main body portion and an align plate affixed to one side of said main body portion for placement in an old

hinge route of an old door, so that a new hinge route on siad new door will be set across the same distance as on said old



door which is held clamped together with said spacer blocks and new door.

4,586,263

PENDULUM LEVEL

Charles E. Brattain, 1224 S. Minister Dr., Tucker, Ga. 30084

Filed Mar. 15, 1985, Ser. No. 712,381

Int. Cl.[4] G01C *9/12*

U.S. Cl. 33—353 **4 Claims**

1. A pendulum level comprising a frame with two spaced cross bars, a scale near the top and bottom of the frame, a pendulum, a level, means to pivotally secure the pendulum to one of the cross bars, means to detachably secure the pendulum to the other cross bar, and means to adjustably secure the level to a side of the frame; and the means to pivotally secure the pendulum to one of the cross bars include a bushing and a sex bolt and openings in pendulum and the cross bar, the bushing is slightly longer than the combined thicknesses of the pendulum and the cross bar, and the opening in the pendulum is slightly larger than the bushing.

4,586,264

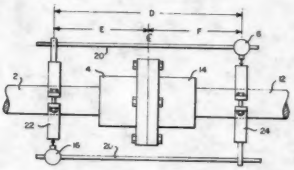
METHODS FOR MEASURING ALIGNMENT OF COUPLED SHAFTS

John M. Zatezalo, Pittsburgh, Pa., assignor to Industrial Maintenance Systems, Inc., Pittsburgh, Pa.

Filed Dec. 31, 1984, Ser. No. 687,722

Int. Cl.[4] G01B *5/25*

U.S. Cl. 33—412 **18 Claims**



1. A method for determining alignment of a first shaft and a second shaft coupled together by a coupling comprising the steps of:

a. suspending a first dial indicator gauge having a pin type contact over the second shaft so that its pin type contact abuts one of the second shaft and a portion of the coupling generally parallel to the second shaft;

b. suspending a second dial indicator gauge having a pin type contact over the first shaft so that its pin type contact abuts one of the first shaft and a portion of the coupling generally parallel to the first shaft;

c. taking a reading r_1 on the first dial indicator gauge;

d. taking a reading r_2 on the second indicator gauge;

e. measuring the horizontal distance d_1 between the first gauge and the second gauge;

f. determining angularity between the first shaft and the second shaft by solving:

$$\text{Angularity} = (r_1 + r_2)/2d_1;$$

and

g. comparing the angularity to a predetermined set of acceptable angularity values.

4,586,265

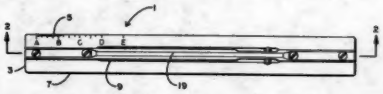
PERSPECTIVE DRAWING APPARATUS

William G. Hopkins, 117 Merrifield Dr., Greenville, S.C. 29615, and Philip L. Reid, Rt. 2, Box 422, Duncan, S.C. 29334

Filed Oct. 29, 1984, Ser. No. 666,104

Int. Cl.[4] B43L *13/14*

U.S. Cl. 33—432 **2 Claims**



1. A drafting apparatus for use in producing a perspective drawing, comprising:

a rule defining two parallel linear edges and defining in a central portion thereof a slot;

an axle mounted in said slot;

first wheel means mounted on said axle;

second wheel means mounted on said axle; and

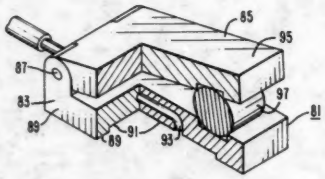
wherein said first wheel means is of a greater diameter than said second wheel means whereby when said apparatus is rotably moved across a planar surface, said apparatus moves in an arc about a circle toward which one of said linear edges is always directed.

4,586,266

HIGH PRECISION GAGING BLOCK

Hans E. Leumann, Washington, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 22, 1984, Ser. No. 663,243
Int. Cl.[4] G01B 3/30
U.S. Cl. 33—531 10 Claims



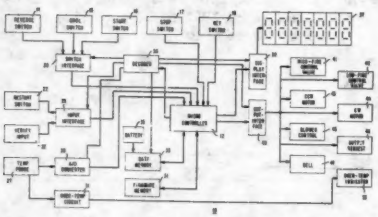
1. A gaging block for selective attachment to a surface of a workpiece comprising a body having a first body section and a second body section pivotably attached thereto, said first body section having a first face adapted to conform to the workpiece surface and including at least one recess portion disposed therein and a port means in communication with said recess portion and adapted to be in communication with a negative pressure-generating means wherein said first body section is removably secured to the workpiece surface by the generation of a negative pressure in said first face recess portion; and said second body section has a second face defining a measurement reference surface, wherein the measurement reference surface can be selectively, angularly positioned relative to the workpiece onto which said first body section is removably mounted.

4,586,267

AUTOMATED REVERSIBLE-DRYER CONTROL SYSTEM

Arthur Sussman, Alpine, N.J., assignor to Intraspec, Inc., Bogota, N.J.

Filed Aug. 7, 1984, Ser. No. 638,490
Int. Cl.[4] F26B 25/22
U.S. Cl. 34—30 42 Claims



27. A method for controlling a dryer displacing a load to be dried in at least two directions during operation and capable of applying heat to the load, said method comprising:

periodically measuring a parameter representative of the moisture content of the load to be dried, said measurements substantially all occurring while the load is being displaced in a selected one of said two directions;

determining the moisture content of the load from said measurements; and

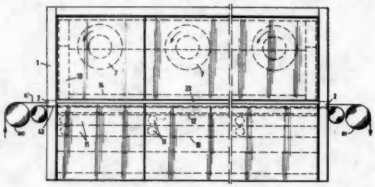
applying heat to the load to be dried in response to a result of said comparison.

4,586,268

HEAT TREATMENT TUNNEL

Heinz Fleissner, Riehen, Switzerland, assignor to Vepa Aktiengesellschaft, Basel, Switzerland

Filed Feb. 22, 1983, Ser. No. 468,299
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1982, 3205962; Feb. 20, 1982, 3206158; May 4, 1982, 3216558; Jun. 23, 1982, 3223401
Int. Cl.[4] F26B 13/10
U.S. Cl. 34—68 28 Claims



1. A horizontal heat treatment tunnel for the treatment of fibers, threads, slit film or the like fibrillary material used in the textile field, wherein the material to be heat treated is transported side-by-side along a travel path, in endless length form, through the horizontally arranged tunnel, said tunnel comprising a heat-insulated housing having a treatment chamber, an inlet means for allowing entry of the material and an outlet means for allowing withdrawal of the material from the housing; a fan chamber; fan means arranged within said fan chamber for effecting circulation of a gaseous treatment medium within said housing and through said treatment chamber; heater means disposed downstream of said fan means in the treatment chamber for heating said treatment medium before the treadment medium contacts fibrillary material moving along said travel path through said treatment chamber; fan intake connecting means positioned solely to draw the gaseous treatment medium away from the travel path; fan exhaust means positioned solely to direct the gaseous treatment medium toward the travel path through the fibrillary material and toward the fan intake connecting means; said fan intake connecting means including a fan intake chamber that is narrowed conically away from the travel path on both sides towards the center of the travel path for promoting uniform flow of the treatment medium through the fibrillary material; said heater means extending in parallel with and in close juxtaposition to the travel path over the entire length and width of the travel path; screen wall means arranged above and below said heater means for regulating the flow of treatment medium through said heater means whereby heat is retained around said heater means; means for sealing marginal zones of the heater means so that said zones are gas-impermeable to prevent heat losses from said heater means; and guide means outside of said heat-insulated housing for transporting the fibrillary material along said travel path through the treatment chamber within said housing in a contact-free manner.

4,586,269

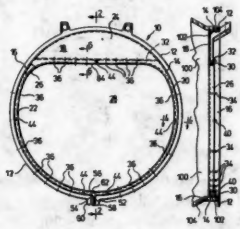
DRIER BEARING

Robert M. St. Louis, St. Leonard, Canada, assignor to Camco Inc., Mississauga, Canada

Filed Apr. 30, 1985, Ser. No. 729,043
Claims priority, application Canada, Nov. 16, 1984, 468023
Int. Cl.[4] F26B 11/00
U.S. Cl. 34—133 9 Claims

1. A drier drum bearing member comprising an outer substantially right cylindrical outer wall, the outer surface of which is adapted to form a bearing to be received in an access opening in a drier drum to form a bearing for the drum, an inner wall extending coaxially with and positioned radially inward of said right cylindrical wall substantially parallel to

the outer wall and defining a non-circular access opening through said bearing member, a facing wall interconnecting said inner and outer walls, said inner wall being positioned immediately adjacent said outer wall over a major portion of the periphery of said access opening to provide a first portion of a mounting cavity between said inner and outer walls, a joining wall substantially parallel to said inner wall and combining with said inner wall to form a second portion of said



cavity, said first and second portions combining to extending substantially 360° around the periphery of said access opening, spaced bosses extending from a wall of said cavity toward an opposite wall of said cavity, at least some of said bosses having abutment edges substantially perpendicular to said inner and outer walls and spaced from said facing wall to provide a free space between said abutment edge and said facing wall adapted to receive a mating structure therebetween.

4,586,270

BED THICKNESS LEVELLING DEVICE FOR A COOLING COLUMN

Alfred Klöckner, Hirtscheider Str. 13, D-5239 Nistertal, Fed. Rep. of Germany

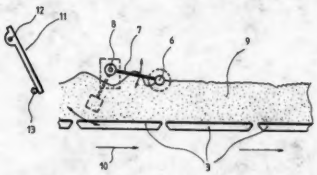
PCT No. PCT/EP84/00082, § 371 Date Nov. 19, 1984, § 102(e) Date Nov. 19, 1984

PCT Filed Mar. 20, 1984, Ser. No. 674,925

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1983, 3310360

Int. Cl.⁴ F26B *17/12*

U.S. Cl. 34—173 **12 Claims**



1. A bed thickness levelling device for a cooling column in which a feed material to be cooled or dried circulates on a plurality of sieve bottoms rotating about an axis of rotation and disposed one above the other said material being intermittently transferred onto a respective subjacent sieve bottom, comprising: a levelling rod (**6**); support means (**21**) carrying the levelling rod for oscillating movement about a stationary pivot axis parallel to the axis of the levelling rod (**23**) thereof said levelling rod extending substantially transversely of the direction of movement of said feed material and in its operating position resting on said feed material and being oriented in a position in which its end facing toward the axis of rotation (**4**) of the respective sieve bottom (**5**) is offset relative to the radial direction (**27**) of said sieve bottom in the direction of rotation (**10**) thereof by an angle of about 5° to 8°.

4,586,271

EXTENDIBLE BOOT

John R. K. Maleyko, 609 Belle River Rd., Belle River, Ontario, Canada (N0R 1A0), and Gerald Grijak, 4721 Pickwick Dr., Sterling Heights, Mich. 48077

Filed Aug. 10, 1984, Ser. No. 639,501

Int. Cl.³ A43B *3/00*

U.S. Cl. 36—1.5 **8 Claims**

1. An extendible boot comprising,

a base portion and an extendible portion,

said extendible portion comprising a flexible sleeve joined to said base portion by a peripherally extending joint and being open at its upper end,

said sleeve being rollable from its upper end to form an annular roll at said joint and thereby provide an unextended boot,

said sleeve being unrollable from said annular roll to a higher position than the position of said joint and thereby provide an extended boot,

a cuff having a fixed end connected with one of said portions in the vicinity of said joint and having an open free end and a foldable part between said ends adapted to be folded over said annular roll,

fastening means including at least one fastener comprising first and second complementary parts adapted to be coupled to and uncoupled from each other,

said first complementary part being mounted on one of said portions,

and said second complementary part being mounted on said cuff,

whereby said annular roll may be retained and concealed by folding said cuff and coupling said parts of said fastener to each other.

4,586,272

GAITER FOR GRAVITY RELIEVING APPARATUS

Helmut Forster, Greppenstrasse 77, 8031 Alling, Fed. Rep. of Germany

Filed May 24, 1984, Ser. No. 613,964

Claims priority, application Fed. Rep. of Germany, May 31, 1983, 8315953[U]

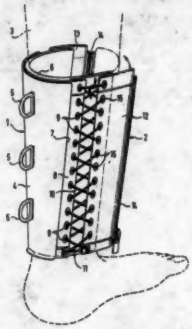
Int. Cl.⁴ A41D *17/00*

U.S. Cl. 36—2 R **15 Claims**

1. Gaiter for gravity relieving apparatus comprising:

a casing arrangement for encircling the lower leg at least in the region of the ankle and means for suspending the

gaiter aloft, said casing arrangement comprising: two padded casing parts; lacing means for flexibly connecting



said parts together; and quick-release means for opening said casing arrangement for donning and removal.

4,586,273

SHOE INSERT CONSTRUCTION

Bernard Chapnick, 3 Pasper Rd., Beverly, Mass. 01915

Filed Dec. 28, 1983, Ser. No. 566,186

Int. Cl.[4] A43B *13/40, 13/41*

U.S. Cl. 36—44 **9 Claims**

1. A shoe insert comprising: a base layer of a relatively resilient material, a foam layer disposed over the base layer, a fabric disposed over the foam layer, means integrally forming the base layer, foam layer and fabric into a sheet tri-laminate, a support layer disposed only at the heel area of the insert and of a rigid material of higher density than that of the tri-laminate, and means attaching and forming the tri-laminate with the support layer, said support layer being disposed under said base layer, said base and foam layers each being of comparable thickness and each substantially thicker than the fabric layer, said base layer and support layer both constructed of polyurethane foam material, said base layer and foam layer having substantially comparable densities, and said foam layer having a density substantially less than the density of the support layer, said support layer being formed of a compressed polyurethane foam to obtain greater density and thus greater rigidity in comparison to that of the foam layer.

4,586,274

ATHLETIC SHOE CLEATS FOR ARTIFICIAL TURF

Roy D. Blair, 124 Cypress St., Watertown, Mass. 02172

Filed Jun. 11, 1984, Ser. No. 619,775

Int. Cl.[4] A43B *13/26;* **A43C** *13/04*

U.S. Cl. 36—59 R **24 Claims**

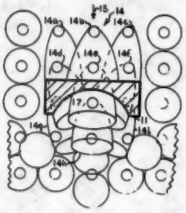
1. In an athletic shoe for use on artificial turf that has a surface of turf fibers, a ground sole with a plurality of cleats that project substantially perpendicular from the surface of the sole, having the improvement comprising:

(a) each cleat has a channel on one side thereof extending substantially perpendicular to the surface of the sole to the end of the cleat,

(b) the side of the cleat opposite said channel side being substantially tapered from the end of the cleat to the surface of the sole,

(c) said channel side of each of said cleats facing the most likely direction of force that the end of the cleat in contact with the artificial turf exerts on the turf during normal intentional maneuvers of the wearer of the shoe,

(d) whereby the artificial turf fibers in the path of the cleat when the cleat moves across the turf in said most likely direction are gathered in said channel and the end of the



cleat bears against the fibers so gathered making relatively high friction contact therewith,

(e) while the same cleat, when moving across the turf in the direction opposite said most likely direction makes relatively low friction contact therewith.

4,586,275

ICE SURFACING APPARATUS

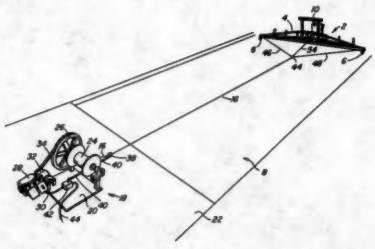
Emile J. Henry, 81 3691 Albion Rd. South, Gloucester, Ontario, Canada (K1T 1P2), and Donald J. Belanger, 50 Mark Ave., Ottawa, Canada (K1L 6A6)

Filed May 13, 1985, Ser. No. 732,943

Claims priority, application Canada, Jul. 12, 1984, 458,731

Int. Cl.[4] E01H *5/10*

U.S. Cl. 37—227 **21 Claims**

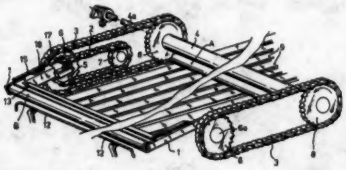


1. Apparatus particularly adapted to draw an ice melting machine at constant slow speed throughout the length of a sheet of ice of a curling rink comprising a frame for removable securement at one end of the curling rink, the frame carrying an electric motor and a rotatably mounted winch drum driven in rotation by the motor through adjustable speed reduction mechanisms, the winch drum carrying a cable of a length to extend the length of a curling rink and the drum having a uniform cylindrical cable winding surface of sufficient size enabling the winding of the length of cable thereon in uniform single winding relationship, the speed of rotation and the diameter of the drum being such as to selectively move the ice melting machine at a speed in the range of between about 3 to 4 feet per minute.

4,586,276
APPARATUS FOR TRANSFERRING FLATWORK

Gerardus H. M. Kuipers, 's-Hertogenbosch, Netherlands, assignor to Amko International B.V., Kerkdriel, Netherlands

Filed May 2, 1985, Ser. No. 729,618
Claims priority, application Netherlands, May 4, 1984, 8401423
Int. Cl.[4] D06F *67/04*
U.S. Cl. 38—8 9 Claims

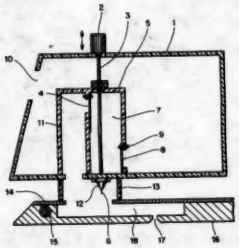


1. Apparatus for depositing spread vertically hung flatwork or similar laundry articles on a continuously movable flat feed belt for conveyance to an ironing calender, comprising a collector rod and an unrolling rod, said collector rod being mounted to reciprocate in a substantially horizontal path to engage a surface of said vertically hung flatwork, said unrolling rod being mounted to move in an orbital path about said collector rod, said collector rod and unrolling rod being arranged for cyclical operation comprising a collecting stage in which on engagement of said collector rod with the surface of said flatwork an edge of said flatwork is laid over said collecting rod and carried thereon, and an unrolling stage in which said unrolling rod passes about said collecting rod to engage the rear surface of said flatwork and in cooperation with said collecting rod lays said flatwork in stretched condition on said feed belt as said collector and unrolling rods disengage from contact with said flatwork.

4,586,277
STEAM IRON WITH PRESSURE EQUALIZATION APPARATUS

Gerald Reiss, Heusenstamm, and Gerd Henneberger, Frankfurt, both of Fed. Rep. of Germany, assignors to Rowenta-Werke, GmbH, Fed. Rep. of Germany

Filed Aug. 14, 1985, Ser. No. 765,896
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1984, 3430120
Int. Cl.[4] D06F *75/18*
U.S. Cl. 38—77.81 4 Claims

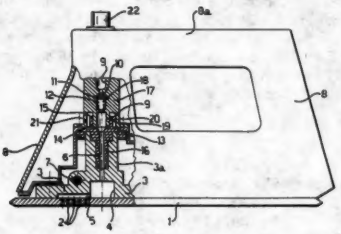


1. A steam iron including a water storage tank, an evaporation chamber to provide steam for ironing, a drip valve for regulating the flow of water from the tank into the evaporation chamber, there being within the tank a pressure chamber connected to the evaporation chamber for pressure equalization therewith, the pressure chamber being connected to receive water from the tank via a non-return valve and being connected to feed water to said evaporation chamber via said drip valve.

4,586,278
STEAM IRON WITH AN EXCESS PRESSURE SAFETY DEVICE

Alfredo Cavalli, via Galileo Galilei, 9, Pesano Con Bornago (Milan), Italy

Filed Feb. 6, 1985, Ser. No. 698,806
Int. Cl.[4] D06F *75/18*
U.S. Cl. 38—77.81 2 Claims

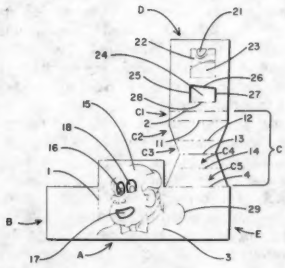


1. A steam iron having a safety device for relief of excess internal pressure, the iron comprising:
a body,
means defining an evaporation chamber in said body,
a water supply duct,
a passage in said body providing liquid communication between said supply duct and said evaporation chamber, and a sleeve having a first end portion sealingly connected to said passage and a second end portion sealingly fitted onto the supply duct, said second portion being resiliently yieldable in response to a predetermined pressure within the sleeve to vent the evaporation chamber of the said body.

4,586,279
FOLDING DISPLAY ASSEMBLY

William G. Hopkins, 117 Merrifield Dr., Greenville, S.C. 29615

Filed Oct. 29, 1984, Ser. No. 666,103
Int. Cl.[4] G09F *1/10*
U.S. Cl. 40—124.1 2 Claims



1. A display device, comprising:
a generally "L"-shaped blank of flexible material (10) having first and second legs connected by a corner panel;
said first leg having an inner panel (A) and an outer panel (B) connected by a first folding score (1);
said second leg having an inner panel (C) and an outer panel (D) connected by a second folding score (2); and
said corner panel (E) connected to said inner panel (A) by a third folding score (3) and connected to said inner panel

(C) by a fourth folding score (4) and wherein said "L"-shaped blank is assembled into an operative structure by:

folding said panel D rearwardly about said score line 2 so as to superimpose said panel D over the back-side of said panel C;

folding panel C1 forwardly about score line 11;

folding panel C2 rearwardly about score line 12;

folding panel C4 rearwardly about score line 14; and

folding panel C5 forwardly about said score line 4, with the result being that said panel D is superimposed over the back-side of said panel E with said panel C being arranged in an accordian-shaped, spring-like mechanism; said panel E being then folded about said score line 3 so as to dispose the printed matter of said panel D behind the printed matter of said panel A with tab 24 being inserted forwardly of eye tabs 18; said panel B being folded about said score line 1 and disposed rearwardly of said panel E and locked thereto by inserting the said panel E into slot 29 to form a compact package.

4,586,280

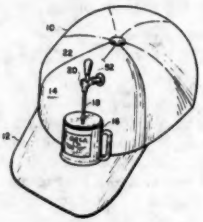
NOVELTY ADVERTISING CAP

Brian Dane, 35891 Argonne, Newark, Calif. 94560

Filed Feb. 25, 1985, Ser. No. 705,080

Int. Cl.⁴ G09F *3/00, 19/00*

U.S. Cl. 40—329 **12 Claims**



1. In combination with a cap having a brim and a substantially vertical frontal section above said brim, an advertising novelty comprising:

a fluid receptacle attached to the frontal section of the cap, said receptacle having a transparent frontal portion for displaying a sheet of advertising material located behind said frontal portion;

a fluid tap having a fluid inlet and outlet, said tap attached to said cap frontal section and positioned above above said receptacle, said tap having a tap handle which, when turned from an "off" position to an "on" position, closes an electrical switch within the body of said tap;

a transparent tube extending from the fluid outlet of said tap into said receptacle;

electrical pumping means within said receptacle;

a fluid conduit coupled between said pumping means and the inlet of said fluid tap; and

an source of electricity coupled through said electrical switch to said electrical pumping means for energizing said pumping means for circulating fluid from said receptacle through said fluid conduit, said fluid tap and said transparent tubing and into said receptacle.

4,586,281

CARTRIDGE MAGAZINE FOR USE WITH A PLURALITY OF FIREARMS

M. Gaines Chesnut, 17219 W. 57th Pl., Golden, Colo. 80401

Filed Mar. 8, 1985, Ser. No. 709,769

Int. Cl.⁴ F41C *25/00*

U.S. Cl. 42—50 **20 Claims**

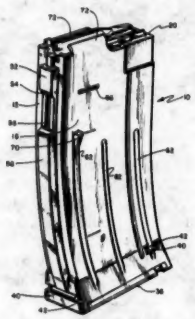
1. A cartridge magazine for housing cartridges and adapted for use with a plurality of styles of firearms, each of the styles of firearms having a cartridge magazine latching mechanism, said magazine comprising:

a case for storing cartridges having a first end;

said case having front, rear, first and second side walls, interior surfaces of said walls defining a magazine chamber;

ledge means on an exterior portion of said rear wall, said ledge means having a ledge wall;

a slot in said front wall, said slot in combination with said ledge means being of such shape and position as to be



capable of engaging the latching mechanism of a first style of said plurality of styles of firearms;

a slot in said first side wall of such shape and position as to be capable of engaging the latching mechanism of a second style of said plurality of styles of firearms;

a follower mounted for sliding movement within said magazine chamber and adapted to contact one of the cartridges; and

means for urging said follower in a direction towards said first end of said case.

4,586,282

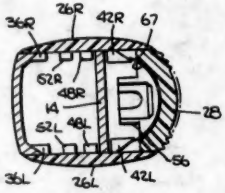
GRIP ASSEMBLY FOR A HANDGUN

Gary Sniezak, Agawam, Mass., assignor to Bangor Punta Corporation, Springfield, Mass.

Continuation of Ser. No. 538,231, Oct. 3, 1983, abandoned. This application Jan. 4, 1985, Ser. No. 688,731

Int. Cl.⁴ F41C *23/00*

U.S. Cl. 42—71 P **15 Claims**



1. In a handgun having a frame with a hollow handle and an opening through each of the opposite sides of the handle, a grip assembly for the handle of the handgun comprising:

a pair of generally flat grips for respectively overlying the opposite sides of the handle,

each of said grips having at least one inwardly directed projection disposed adjacent its forward edge for reception within the corresponding opening in the side of the handgun frame and engagement against the forward edge of such corresponding opening in final assembly of the

grips on the handgun, said projection being undercut along its forward edge to engage the corresponding edge of the frame to preclude movement of the forward edge portion of the grip laterally outwardly of the frame,

each of said grips having an inwardly directed projection disposed adjacent its rear edge, each said rear projection having an undercut along its rear edge,

a heel grip for overlying the rear edge of the handle of said frame,

means carried by said heel grip along opposite sides thereof for respectively engaging the rear projections of said side grips along the undercut rear edges thereof to preclude movement of the rear edge portions of the side grips laterally outwardly of the frame in final assembly of said side grips and heel grip with said frame, and

means carried by said heel grip for securing said heel grip and the frame one to the other.

4,586,283

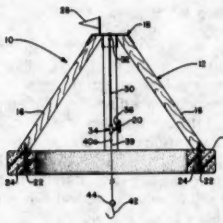
HOOK SETTER

Rodolfo S. Vocal, 1451 Lucas Rd., Mansfield, Ohio 44901-0637

Filed Jun. 17, 1985, Ser. No. 745,781

Int. Cl.[4] A01K *97/00*

U.S. Cl. 43—15 **5 Claims**



1. A free-standing floating water fishing device capable of catching fish while unattended, said fishing device comprising:

an open generally pyramidal shaped frame which includes (1) a base member having a hole in the middle and adapted to float on the surface of the water, and (2) a plurality of converging diagonal frame members extending upwardly from said base member and secured in a fixed relationship at their upper ends;

a resilient tension member suspended from said frame near the top thereof;

a trigger mechanism including a movable member for engaging the lower end of said resilient tension member and normally holding said tension member in tension; and

means for suspending a fishing line from said movable member of said trigger mechanism through said hole.

4,586,284

FISHING LINE SIGNAL

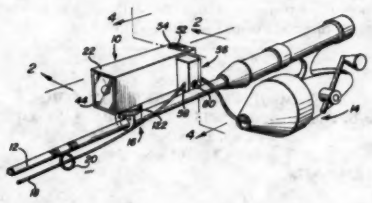
Samuel M. Westwood, III, 2005 Linden St., Bethlehem, Pa. 18017

Filed Jul. 12, 1984, Ser. No. 630,431

Int. Cl.[4] A01K *97/12*

U.S. Cl. 43—17 **10 Claims**

1. A fishing line signal comprising a housing, means mounting the housing on a fishing rod, signal producing means supported by said housing and a switch assembly mounted on said housing in adjustable position and grippingly receiving a fishing line to interrupt a circuit to the signal producing means when the fishing line is positioned in the switch assembly and completing a circuit to the signal producing means when the fishing line is pulled from the switch assembly and means mounting the switch assembly adjustably on the housing to position it in optimum position for receiving the fishing line and varying the pulling force required on the line to remove the fishing line from the switch assembly, said signal producing means including a selector switch to actuate a signal when the circuit to the signal producing means is completed, said housing including a battery assembly for providing a source of electrical energy to operate the signal producing means, said switch assembly including a stationary jaw with a gripping surface and a movable jaw with a gripping surface with the gripping surfaces adapted to receive a fishing line therebetween to space the gripping surfaces apart and frictionally secure the fishing line therebetween, the movable jaw including a contact member, said switch assembly including a stationary contact member with the movable contact member being spaced from the stationary contact member when the fishing line is between the gripping surfaces to interrupt the circuit to the signal producing means, spring means biasing the movable jaw to fishing line gripping position to bias the movable contact into engagement with the stationary contact when the fishing line is removed from between the gripping surfaces, said spring means including a folded leaf spring having diverging leaf components with one component engaging the movable jaw, and an adjustable screw engaging the other leaf component for varying the spring force exerted on the mov-



able jaw thereby varying the clamping force exerted against the fishing line in order to vary the force required to pull the line from between the gripping surfaces thereby varying the sensitivity of the fishing line signal, said means adjustably mounting the switch assembly including a male component of a jack plug mounted on the switch assembly and inserted into a female component of a jack plug mounted interiorly of the housing supporting the signal producing means, and a stay stud on the switch assembly spaced from the male component of the jack plug, said housing for the signal producing means including a plurality of spaced apertures around the female component of the jack plug to enable the position of the switch assembly to be angularly adjusted about an axis defined by the male component of the jack plug when the stay stud is received in a selected one of said apertures thereby orienting the gripping surfaces in varied positions in relation to the housing to adapt the housing for orientation in any position on a fishing rod and to orient the gripping surfaces to vary the tension force required on the fishing line to remove the fishing line from between the gripping surfaces without varying the adjusting screw for the leaf spring.

4,586,285

TOP GUIDE FOR OPEN-FACE REEL

Jeong R. Kim, P.O. Box 408 Gwang Hwa Moon, Seoul, Rep. of Korea

Filed Dec. 10, 1984, Ser. No. 679,749

Claims priority, application Rep. of Korea, Dec. 29, 1983, 11311/1983[U]

Int. Cl.[4] A01K *87/04*

U.S. Cl. 43—24 **1 Claim**

1. A fishing rod top line guide for use on an end of an elongated fishing rod, the line guide comprising:

a tubular body having a closed end and also having an open end for receiving the end of the fishing rod;

a ring having a generally circular shape and also having a U shape defining a line holding groove extending radially

from the circular shape thereof, said U shape of the ring having a closed end connected to the closed end of the tubular body, said groove defined by the U shape of the ring having a width of about 1.5 times the diameter of a fishing line used with the fishing rod in order to automatically hold the fishing line with a knot therealong until a cast is made; and

a brace having two segments extending between the circular shape of the ring and the open end of the tubular body on opposite sides of the groove to support the ring on the tubular body in an inclination with respect to the elongated direction of the fishing rod.

4,586,286

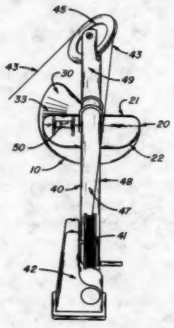
OUTRIGGER LURE DEPTH CONTROL

James L. Cheatham, Jr., 1093 S. Hilton, Boise, Id. 83705

Filed Oct. 15, 1985, Ser. No. 787,666

Int. Cl.[4] A01K *97/00*

U.S. Cl. 43—27.4 **11 Claims**



1. A lure depth control for an outrigger of the type having a base, a boom including a fixed member attached to said base and a rotatable member rotatingly engaging said fixed member, a pulley attached to said rotatable member of said boom, a reel attached to said base, and a cable carried by said reel and engaging said pulley, wherein the lure depth control comprises:

first marker means attached to said fixed member of said boom, said first marker means including an upper surface, at least a portion of which is substantially planar and normal to the longitudinal axis of said boom; and

second marker means affixed to said rotatable member of said boom so as to be rotatable therewith, said second marker means including at least one set of marking indicia including a plurality of straight lines, each of said lines being substantially normal to the longitudinal axis of said boom for determining percentage increase of cable required to reach a known vertical depth from said pulley when said rotatable member of said boom and thus said second marker means is rotated relative to said first marker means by drag upon said cable.

4,586,287

VEHICLE-BORNE APPARATUS FOR SPRAYING AROUND IMMOVABLE OBJECTS

William W. Bleasdale, and Frank E. Boultbee, both of Penticton, Canada, assignors to Okanagan Turbo Sprayers Ltd., Canada

Filed Jul. 2, 1984, Ser. No. 627,064

Int. Cl.[4] A01G *25/09*; B05B *3/12*

U.S. Cl. 47—1.7 **8 Claims**

1. An apparatus to be borne by a tractor, truck or like vehicle, for spraying liquid completely around immoveable upstanding objects, such as trees or poles, having generally circular cross-section, comprising:

(a) an articulated boom comprising an inner and outer, normally aligned, linear members secured, the inner member to be secured to the tractor to extend outwardly from a side thereof, these members being secured to each other at one end so that, during operation, the outer member can pivot about a vertical axis out of alignment with respect to the inner member, in a direction opposite to the direction of motion of the tractor, in a horizontal plane;

(b) biasing means urging the outer member back to aligned position when it pivots out of alignment;

(c) a spray head rotatably secured to the free end of the outer member to rotate about a vertical axis at the center of the head, the head having a plurality of arms radially and outwardly extending from its center, adjacent arms forming angles of 90° or more with respect to each other, the arms to receive between adjacent pairs a portion of the immoveable object;

(d) a spray nozzle at the end of each of the arms;

(e) pipe means to carry liquid to be sprayed to the spray nozzle;

in operation the boom to be moved so that said portion of the immoveable object is received between the arms of the spray head, as the apparatus is moved in one direction to one side of the object, causing the outer boom member to pivot rearwardly and draw the spray head by the object in close proximity thereto, and also causing the spray head to rotate in such a manner that spray from the spray nozzles covers the ground all around the base of the object;

(f) cam means between adjacent arms against which the portion of the object received between the arms is to bear and cause the spray head to rotate as the boom is moved past the object on the one side thereof.

4,586,288

TISSUE CULTURE ROOTING SYSTEM

Charles F. Walton, Hudson, Ohio, assignor to Smithers-Oasis Company, Kent, Ohio

Filed Jul. 18, 1983, Ser. No. 514,564

Int. Cl.[4] A01G *9/02*

U.S. Cl. 47—73 **8 Claims**

1. A tissue culture assembly comprising:

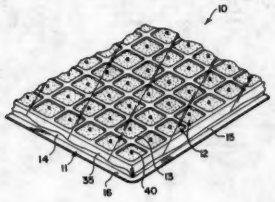
a tray having at least one cavity, each said cavity having a mouth at which is normally the upwardly directed end thereof;

a growing medium received by said cavity, said medium comprising a porous granulated foam filler mixed with a hygroscopic gel,

said foam filler having a density in the range of from about 0.75 to approximately 2.5 pounds per cubic foot (0.012

to 0.04 grams/cm^3) and granulated to pass a 0.25 inch (0.635 cm) mesh screen resulting in a bulk density range of from about 1 to approximately 5 pounds per cubic foot (0.016 to 0.08 grams/cm^3) and having a pH in the range of from about 4.5 to approximately 7.5 and

said gel comprising a copolymer of potassium propenoate-propenamide pulverized to pass through a 20 mesh (0.0084 cm) screen;



a membrane spanning the mouth of said cavity and being secured to said tray; and

an aperture piercing said membrane at approximately the central portion of said mouth to receive a propagule therethrough, said aperture engaging said propagule physically to support said propagule and to maintain said propagule in a predetermined relationship with respect to the medium within said cavity.

4,586,289

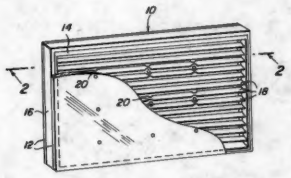
VACUUM INSULATING WINDOW AND REFLECTOR

Warren V. Jaeger, 57 Todd Hill Rd., Poughkeepsie, N.Y. 12603

Continuation-in-part of Ser. No. 545,095, Oct. 25, 1983, abandoned, which is a continuation of Ser. No. 316,043, Oct. 28, 1981, abandoned. This application Apr. 8, 1985, Ser. No. 720,536

Int. Cl.[4] E06B *7/08*

U.S. Cl. 49—64 **14 Claims**



1. A vacuum insulating window and reflector for controlling the heat gain and loss efficiency of an enclosed space and structure, which comprises:

(a) a visually transparent panel having a substantially evacuated hollow cavity;

(b) at least one adjustable vane contained within said hollow cavity;

(c) a highly reflective metallic nonferrous surface on said at least one adjustable vane;

(d) means for externally adjusting the position of said, at least one adjustable vane, from an outside of said visually transparent panel, while maintaining the integrity of a vacuum in said hollow cavity, whereby the amount of heat and radiant energy passing through said vacuum insulating window and reflector is controlled by the position of said at least one adjustable vane; and

(e) strengthening means provided to reinforce the strength of said visually transparent panel without interfering with any movement of said adjustable vanes, wherein said strengthening means further comprises at least one convex outward visually transparent panel.

4,586,290

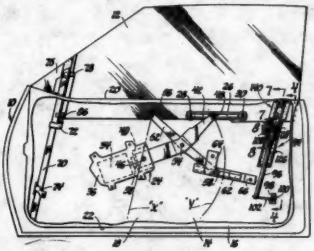
TELESCOPING WINDOW STABILIZING MECHANISM

Tadge J. Juechter, Stanford, Calif., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 25, 1985, Ser. No. 715,983

Int. Cl.[4] E05F *11/38*

U.S. Cl. 49—348 **3 Claims**



1. In a vehicle body door having a window opening and a window storage cavity beneath the window opening, a window movable between a raised position closing the opening and a lowered position stored in the storage cavity, and window regulator means connected to the window for moving the window along a defined path of movement between the raised and lowered positions, a telescoping stabilizing mechanism comprising:

a guide track mounted on the door within the storage cavity;

a stabilizer strut slidably interengaged with the guide track for vertical movement therealong between a lowered position in which the bottom of the stabilizer strut extends below the guide track and a raised position in which the top of the stabilizer strut extends above the guide track;

a slider channel attached to the window and slidably interengaged with the stabilizer strut for vertical movement therealong between the top of stabilizer strut when the window is fully raised and the bottom of the stabilizer strut when the window is fully lowered; and

said sliding interfit between the slider channel and the stabilizer strut being characterized by tapered walls provided respectively thereon and facing toward one another, said tapered walls cooperating to provide a small area of frictional contact therebetween during vertical movement of the window and the slider channel with respect to the stabilizer strut and coming into full length large area contact therebetween when the window and slider reach the fully raised position to provide a substantial bearing length between the slider channel and the stabilizer strut to substantially stabilize the glass laterally of the vehicle.

4,586,291

SHALLOW DOUBLE HUNG WINDOW

Charles A. Swan, Seminole, Fla., assignor to Windows, Inc., Largo, Fla.

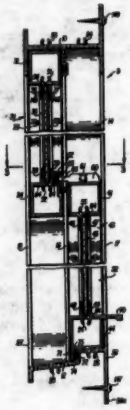
Continuation of Ser. No. 496,937, May 23, 1983, which is a continuation of Ser. No. 217,987, Dec. 18, 1980, Pat. No. 4,420,907, which is a continuation-in-part of Ser. No. 216,813, Dec. 16, 1980, abandoned, which is a continuation of Ser. No. 923,344, Jul. 10, 1978, Pat. No. 4,238,907, which is a continuation-in-part of Ser. No. 758,866, Jan. 12, 1977, abandoned. This application Nov. 23, 1984, Ser. No. 673,943

Int. Cl.[4] E06B *3/00*

U.S. Cl. 49—501 **6 Claims**

1. A double hung window comprising a casing having a pair of jamb channels along each side defined in part by an opposing pair of middle guides, a pair of sash members, each said sash member slidably received in a respective jamb channel, each said sash member comprising vertical stiles and horizontal rails which surround and carry a window pane, the lower rail

of an upper said sash member when the window is closed, each said stile defining inward and outward facing grooves for its entire height within said jamb channels, vertical sealing strips received within said jamb channels, vertical sealing strips received in each said groove and engaging said jamb channels for said stile's entire height, said upper sash member's lower rail having an inwardly facing horizontal groove for its entire width across the window which extends into said jamb channels receiving such sash member and to and between said inward facing vertical grooves in said stiles of such sash member, and a horizontal sealing strip received in said horizontal groove for its entire width so that it is in said horizontal groove for its entire width so that it is in sealing engagement between the inward face of the lower rail of said upper sash member and the outward face of the top rail of said lower sash member for the latter's entire width between said pair of middle guides and is in sealing engagement between said pair of middle guides and the outboard ends of the lower of said rails in said upper sash member to where said horizontal sealing strip meets the vertical sealing strips received in said inward facing vertical grooves of said stiles of said upper sash member.



4,586,292

MACHINE IMPARTING COMPLEX ROTARY MOTION FOR LAPPING A SPHERICAL INNER DIAMETER

Thomas A. Carroll, Santa Fe, and Harold H. Yetter, Los Alamos, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 30, 1985, Ser. No. 696,550
Int. Cl.[4] B24B *31/00, 11/00*
U.S. Cl. 51—2 R **12 Claims**

1. An apparatus for imparting complex rotatary motion to at least one subject comprising:

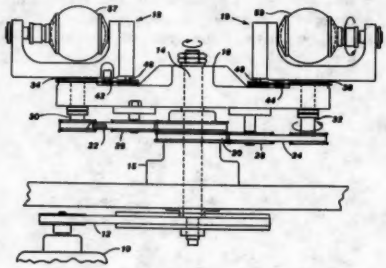
at least one holding means for said subject which rotates said subject around a horizontal axis;

at least one means for rotating said holding means around a vertical axis;

at least one rotating arm to which said rotating means is attached at a radially outward position, said rotating arm rotating about a vertical axis counter to the rotary motion of said rotating means;

a power means to rotate said rotating arm;

at least one takeoff means to derive power from power means and induce rotary motion to said rotating means; and



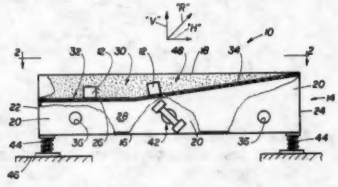
at least one secondary takeoff means to derive power from takeoff means and transmit power to said holding means for inducing rotary motion to said subject.

4,586,293

METHOD AND APPARATUS FOR SURFACE TREATING A WORKPIECE

James R. De Spain, Prospect, and Michael W. Burke, Louisville, both of Ky., assignors to Carrier Vibrating Equipment, Inc., Louisville, Ky.

Filed Apr. 27, 1984, Ser. No. 604,926
Int. Cl.[4] B24B *19/00*
U.S. Cl. 51—7 **14 Claims**



1. A method of surface treating a workpiece comprising the steps of:

continuously passing a gas upwardly through a substantially stationarily positioned horizontally oriented, elongated bed of a surface media contained in an elongated horizontally oriented reservoir to fluidize the bed;

continuously imparting a substantially vertical vibratory force to the bed of surface treating media to further fluidize the bed and aggitate the bed of surface treating media;

submerging the workpiece in the fluidized, aggitated bed of surface treating media at one end of the reservoir; and

imparting a generally horizontal vibratory force to the reservoir for conveying the workpiece in a substantially linear direction through the bed of surface treating media from the entrance end of the reservoir to the exit end of the reservoir opposite the entrance end.

4,586,294

MACHINE TOOLS

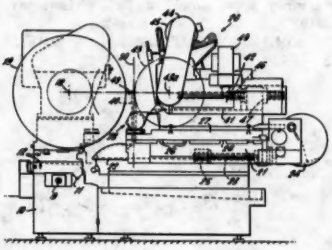
Raymond T. Shackleton, Crossroads, England, assignor to Keighley Grinders (Machine Tools) Limited, Keighley, England

Continuation of Ser. No. 661,890, Oct. 18, 1984, abandoned, which is a continuation of Ser. No. 473,677, Mar. 8, 1983, abandoned, which is a continuation-in-part of Ser. No. 179,756, Aug. 20, 1980, Pat. No. 4,376,357. This application Feb. 27, 1985, Ser. No. 705,417

Claims priority, application United Kingdom, May 21, 1980, 8106766

Int. Cl.[4] B24B *19/14*

U.S. Cl. 51—105 SP 45 Claims



1. A machine tool, comprising:

workpiece support means for supporting a workpiece to rotate about a fixed first axis for an operation to be carried out on a peripheral part of said workpiece at a work station adjacent said workpiece;

slide means for supporting said workpiece support means for movement of said workpiece in the direction of said fixed first axis to present different locations along said workpiece for operation thereon at said work station;

a rotary tool having a peripheral cutting face;

a feed slide for said tool;

means to feed said feed slide towards and away from said fixed first axis for said tool to act on said workpiece;

a tool carrier;

means to mount said tool on said tool carrier for rotation of said peripheral cutting face;

means to mount said tool carrier on said feed slide for rotational adjustment about a second axis lying tangential to a circle defining the periphery of said peripheral cutting face of said tool;

means to mount said tool for linear adjustment on said tool carrier towards and away from said second axis for bringing said peripheral cutting face of said tool to a point tangential to said second axis at which said point the peripheral cutting face of said tool engages said workpiece such that said rotational adjustment of said tool about said second axis does not otherwise radially displace said peripheral cutting face of said tool at said point where said peripheral cutting face engages said workpiece;

mounting means on the machine tool coincidental with said second axis, a removable tool alignment means capable of being supported by said mounting means along said second axis prior to a cutting operation for cooperation with said linear adjustment means for thereby aligning the peripheral cutting face of said tool at said point to said second axis prior to the cutting operation; and

means to turn said tool carrier about said second axis to any one of a number of defined positions of adjustment to provide a number of differing angles of operation of said tool on said workpiece such tht automatic control of said operation is facilitated.

4,586,295

WORKPIECE CENTERLESS SUPPORT DEVICE FOR USE IN INTERNAL GRINDING MACHINE

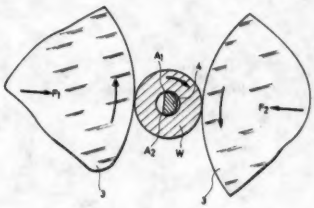
Katsutoshi Ishii, Narashino, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Chiba, Japan

Filed Dec. 21, 1984, Ser. No. 684,609

Claims priority, application Japan, Dec. 26, 1983, 58-200928[U]

Int. Cl.[4] B25B *5/00*

U.S. Cl. 51—236 1 Claim



1. In the internal grinding machine intended to perform the concentric bore processing, rotatably supporting the workpiece of which bore is processed in the previous processing step, a workpiece centerless support device for use in the internal grinding machine, comprises of an internal shoe which penetrates the internal bore of the workpiece and contacts with two points internally thereof so as to rotatably support the workpiece; a couple of drive rolls arranged on both side portion of the internal shoe; a couple of spring means which energizes each drive rolls toward the circumference of the workpiece and of which spring pressure is determined in alternatively differential rate so that the contacting location against the internal shoe of the workpiece is always preserved in the side of two contact points; a pusher plate which is inserted from end portion of the workpiece to surround the circumference of the workpiece; an outlet of coolant which is provided. on the pusher plate in a manner of being opposed to the other surface of the workpiece.

4,586,296

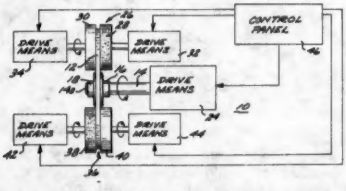
METHOD OF FINISHING THE SURFACE OF A DISC

Jimmy G. Saunders, El Toro, Calif., assignor to Charlton Associates, Irvine, Calif.

Filed Jul. 3, 1984, Ser. No. 627,437

Int. Cl.[4] B24B *1/00*

U.S. Cl. 51—281 SF 5 Claims



1. A method of finishing the opposite sides of a substantially coplanar disc comprising the steps of:

rotating the disc at a predetermined speed,

contacting simultaneously each of the opposite sides of said disc with a polishing pad having a polishing medium thereon but at locations on said disc which are spaced the same distance from the axis of rotation of the latter and which are symmetrically located relative to the axis of rotation of said disc, and

contacting each of said opposite sides of said disc with a pad

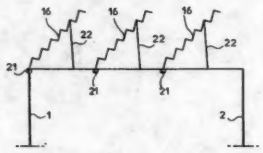
free of polishing medium at a location on said disc opposite to the respective polishing pad.

4,586,297

AGRICULTURAL GREENHOUSE WITH A FLAT ROOF

Jean P. Tagiasco, Noves, France, assignor to J. T. Province S.A., Noves, France

Filed Apr. 26, 1984, Ser. No. 604,013
Claims priority, application France, Apr. 28, 1983, 83 06996
Int. Cl.⁴ A01G *9/24;* E04B *7/16*
U.S. Cl. 52—1 **8 Claims**



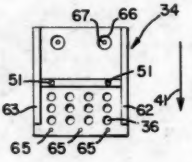
1. Agricultural greenhouse of the type comprising a metallic frame supporting transparent covering elements which have asymmetrical slopes, wherein said frame comprises at least two frame members having upper ends arranged so as to be alined in east-west direction and each of which is in the form of two posts interconnected by a reinforcing girder, with the upper ends of said frame members being interconnected by a plurality of girders comprising means support said frame receiving said covering elements, formed as panels of transparent plastic material, mounted flatwise and having undulations, parallel to said frame members, said undulations each having two asymmetrical slopes of angle **2** and **3** the greater of which is directed southward, with the angle α between the greater slope and the horizontal being about 25° to 35°, and the angle β between the smaller slope of each undulation and the horizontal being about 55° to 65°, and at least one of the covering elements is mounted pivotally around a horizontal axis at its free edge directed southward, with control means being provided for causing said movable covering panels to pivot by a predetermined angle.

4,586,298

GUTTER GUARD

George O. Colp, 58 Fuller St., Canton, Mass. 02021

Filed Jun. 4, 1984, Ser. No. 616,691
Int. Cl.⁴ E04D *13/06*
U.S. Cl. 52—12 **8 Claims**



1. A gutter cover comprising in combination with a rain gutter mounted on a building having a shingled roof,

a first plane surface of sufficient width to extend up under the first course of shingles on the building to the outer edge of the rain gutter affixed said building,

a second plane surface forming a pocket with said first plane surface under said first course of shingles to receive a shutter,

said first plane surface having preselected openings along the edge whereby water will enter the gutter while leaves and other debris will be excluded,

shutter means for covering said openings during severe weather, which shutter slides up into said pocket and is storeable in said pocket during mild weather whereby rain water enters the gutter freely through said openings in the warm weather, and

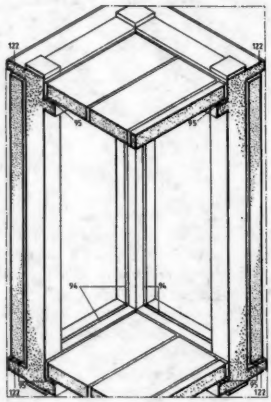
means for affixing said cover to said gutter.

4,586,299

BUILDING SYSTEM OF INTERCONNECTED BLOCK ELEMENTS

Helmuth Bayer, Liliencronstr. 8, 1000 Berlin 41, Fed. Rep. of Germany

PCT No. PCT/DE80/00100, § 371 Date Mar. 16, 1981, § 102(e) Date Mar. 16, 1981, PCT Pub. No. WO81/00271, PCT Pub. Date Feb. 5, 1981
PCT Filed Jul. 9, 1980, Ser. No. 247,563
Claims priority, application Fed. Rep. of Germany, Jul. 19, 1979, 2929197
Int. Cl.⁴ E04B *1/348, 5/57;* E04G *21/14;* E04F *15/024*
U.S. Cl. 52—79.7 **10 Claims**



1. A building system, including a plurality of interconnected block elements (**1–10**), each block element (**1–10**) comprising:

six sides, eight corners, and a rectangular base, all enclosing an open space in the shape of a parallelepiped having a rectangular cross-section on all sides,

four column base plates (**21**) placed within four interior angles of the rectangular base,

four upstanding columns (**17**) being placed on top of each of the four column base plates (**21**),

four side walls (**27** and **30**) crossing between the four upstanding columns (**17**) and being laterally supported by the four upstanding columns (**17**),

a lower load-bearing beam (**19**) having an outside edge and an inside edge, ringing the perimeter of the rectangular base, interconnecting bottoms of the four upstanding columns (**17**), and serving as a bottom support for the four side walls,

a lower outwardly projecting beam (**20**) being attached to the outside edge of the lower load-bearing beam (**19**),

one of at least one outer building wall and at least one interior fire wall being retained at a bottom thereof by the lower outwardly projecting beam (**20**),

a lower inwardly projecting beam (**18**) being attached to the inside edge of the lower load-bearing beam (**19**) at the same height as the lower outwardly projecting beam (**18**),

one of a floor and a ceiling/floor combination being supported by the lower inwardly projecting beam (**18**),

an upper load-bearing beam (**15**) having an outside edge and an inside edge, being positioned above the lower load-bearing beam (**19**) at a height of the side wall therebe-

tween, interconnecting tops of the four upstanding columns, and serving as a top support for the four side walls,

an upper outwardly projecting beam (14) being attached flush with the top of the outside edge of the upper load-bearing beam (15) and serving as a top retainer for said one of the at least one outer building wall and the at least one interior fire wall,

an upper inwardly projecting beam (16) being attached flush with the bottom of the inside edge of the upper load-bearing beam (15) and being spaced from the upper outwardly projecting beam (14),

one of a ceiling/roof and a ceiling/floor combination being supported by the upper inwardly projecting beam (16), and

four column cap plates (13) placed over the four upstanding columns (17).

4,586,300

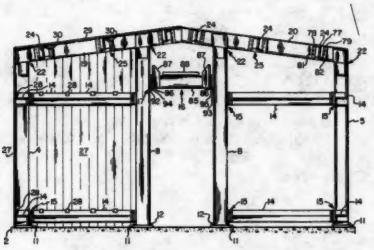
BUILDING CONSTRUCTION

Edward L. Mullin, 307 Quaker Rd., Sewickley, Pa. 15143

Filed Oct. 28, 1983, Ser. No. 546,540

Int. Cl.[4] E04B *7/00*

U.S. Cl. 52—93 **13 Claims**



1. A building having a first structural element of the building framework connected to a second structural element of the framework by means capable of withstanding sheer and moment loads said means comprising:

(a) a slot portion attached to the first structural element at a location where the first and second structural elements are to be connected together, said slot portion including a straight slot portion and a sloped slot portion spaced apart and in opposition to each other, said straight slot portion including a straight edge which extends upwardly from said first structural element and faces the sloped slot portion, said sloped slot portion including a sloped edge which extends upwardly from said first structural element and faces said straight slot portion, said straight edge and said sloped edge defining a slot therebetween whose width decreases from one end of the slot to the other and is adapted to receive a wedge, and

(b) a wedge portion attached to the second structural element, said wedge portion being a flat plate of the same approximate thickness of said slot portion and in the shape of a trapezoid with two right angles adjacent each other, said wedge including a straight edge and a sloped edge opposite each other whereby said wedge decreases in width from one end to the other and when said wedge is engaged to said slot portion within the slot, the straight edges of the wedge and of the straight slot portion are in engagement and the sloped edges of the wedge and of the sloped slot portion are in engagement.

4,586,301

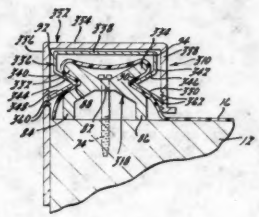
RETAINER CLAMP MEMBRANE FASTENING SYSTEM

John B. Hickman, Asheville, N.C., assignor to W. P. Hickman Company, Asheville, N.C.

Filed Aug. 6, 1984, Ser. No. 638,342

Int. Cl.[4] E04D *5/14*

U.S. Cl. 52—96 **14 Claims**



1. A retainer clamp assembly for attaching a flexible membrane to a surface without puncturing said membrane comprising:

an elongated core member having a pair of extending arms, means for attaching said core member to said surface,

an elongated retainer clip having a center section and a pair of separated legs, each of which terminate along a clip edge, said retainer clip conformed to fit over said core member with said membrane therebetween, and

at least one clamping piece having a center section and a pair of separated wall portions, said clamping piece conformed to fit over and enclose said retainer clip, said clamping piece wall portions engageable with said retainer clip edges whereby said retainer clip and said clamping piece are held together in an assembled condition and cooperate to clamp said membrane against said core member.

4,586,302

CONSTRUCTION-TYPE SUPPORT SYSTEM

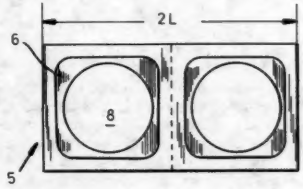
Hans-Georg Kretschmar, Essen, Fed. Rep. of Germany, assignor to Cube-System Gerustbau GmbH, Essen, Fed. Rep. of Germany

Filed Oct. 7, 1983, Ser. No. 539,836

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1982, 3237467

Int. Cl.[4] E04H *12/08*

U.S. Cl. 52—173 R **10 Claims**



6. A construction-type support system comprising:

a plurality of at least generally parallelopipedal blocks each having top and bottom walls formed respectively with complementary vertical and generally square projections and recesses and substantially flat and planar side walls, the blocks fitting together with the projections interengaged and preventing relative horizontal shifting, the walls all being formed of sheet steel and each being formed with a central circular hole, the holes all being identical and of smaller cross section than the projections and recesses;

respective platforms atop the top walls of some of the blocks; and

respective jacks in the blocks underneath the platforms that are vertically extensible to lift the platforms from the respective blocks.

4,586,303

PROCESSES AND DEVICES FOR PRESTRESSING CONCRETE WORKS AND TO THE CORRESPONDING WORKS

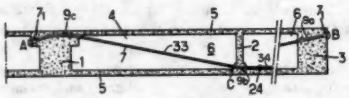
Pierre Jartoux, Epernon, and Christian Brondeau, Lesigny, both of France, assignors to Freyssinet International, Boulogne Billancourt, France

Filed May 30, 1984, Ser. No. 615,265

Claims priority, application France, Jun. 3, 1983, 83 09278

Int. Cl.[4] E04C *3/10*

U.S. Cl. 52—309.16 **4 Claims**



1. A concrete work including blocks and cavities therebetween; said concrete work being prestressed by means of replaceable tensioned reinforcements (7) having bell mouthed ends (7_1) which anchor the reinforcements in opposed blocks, intermediate the ends the reinforcements are formed from an alternating sucession of (a) first tubular sections housed, with interpositioning of a filling material, in tubular metal sheaths (9) themselves embedded in the associated block and (b) second rectilinear sections external to the concrete in an associated cavity; characterized in that each of the first sections extend along an arc of a circle so as to be withdrawable through the surrounding metal sheath in the block and in that each reinforcement is housed, at least all along said first sections, in a plastic material tube (10) adapted to slide axially along the respective metal sheath.

4,586,304

INSULATED SIDING AND METHOD FOR ITS APPLICATION

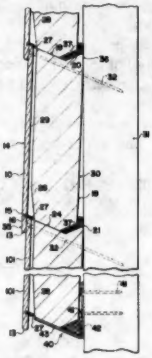
Robert Flamand, Box 1301, Hudson Bay, Saskatchewan, Canada (S0E 0Y0)

Filed Jul. 24, 1984, Ser. No. 630,714

Int. Cl.[4] E04D *1/00*

U.S. Cl. 52—309.8 **18 Claims**

1. An insulated siding for attachment to an outer face of a building comprising a transversely elongate front facing panel having front and rear surfaces and top and bottom edges and a character suitable to provide an exterior surface panel for a building and a layer of rigid plastics foam having a front surface laminated to a rear surface thereof and a rear surface spaced therefrom and parallel to the front surface, a strip of the rear surface adjacent the bottom edge of the panel being free from foam whereby it can overlie the front surface of the next adjacent lower panel, an upper surface of the foam being V-shaped in cross section to provide a portion inclined downwardly away from the upper edge of the panel and a portion adjacent the rear surface of the foam inclined upwardly thereto, a lower surface of the foam defining a downwardly inclined portion and an upwardly inclined portion substantially parallel to an coextensive with those of the upper surface whereby the lower surface of the foam of an upper panel engages the upper surface of the foam of a lower panel and acts to interlock the panels the panel having a thickness that the overlaying bottom edge thereof causes the formation of a first space between the upwardly inclined portion of the upper surface of the lower panel and the upwardly inclined portion of the lower surface of the upper panel and causes the rear surface of the foam to engage the outer face of the building in



line contact across an upper edge of the rear surface defining a second space between the lower edge of the rear surface and the outer face of the building and a sponge material in said first and second spaces.

4,586,305

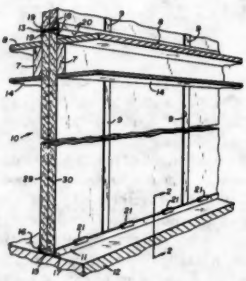
CLIP FOR USE WITH RUNNER AND AREA SEPARATION WALL STRUCTURE UTILIZING CLIP

Henry A. Balinski, Hoffman Estates, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Apr. 2, 1984, Ser. No. 596,029

Int. Cl.[4] E04B *2/84*

U.S. Cl. 52—241 **4 Claims**



1. A wall structure comprising in combination:

(1) an integral U-shaped runner comprising:

(a) a web, and

(b) a pair of flanges extending from the edges of said web,

(2)a plurality of integral clips each comprising:

(a) a platform web,

(b) a pair of flanges extending upwardly from said platform web, and

(c) a pair of flanges extending downwardly from the upwardly extending flanges, said upwardly extending flanges and said downwardly extending flanges cooperating to define slots receiving the respective flanges of said runner along the entire length of said slots with the edges of said runner flanges supporting said clip, and

(3) one or more wall panels having their lower edges in contact engagement with and supported by the platform

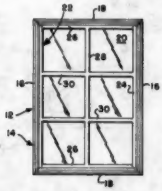
web of said clips at a distance elevated above the web of said runner to prevent contact with any water which may collect in said runner.

4,586,306

WINDOW ASSEMBLY AND GRILLE RETAINING STRIP HARDWARE THEREFOR

Dale P. Webb, Conneaut, Ohio, assignor to Webb Manufacturing, Inc., Conneaut, Ohio

Filed Feb. 26, 1985, Ser. No. 705,622
Int. Cl.[4] E06B *3/70*
U.S. Cl. 52—311 **9 Claims**



1. A retaining strip for attaching a decorative grille to the periphery of a glass-closed opening in a window, the grille having a mounting surface transverse to the plane of the opening and a peripheral groove in the mounting surface, and the window including opposed peripheral surfaces surrounding the opening, such opposed peripheral surfaces extending transverse to the plane of the opening, said retaining strip being provided to extend substantially the entire length of at least two of said opposed peripheral surfaces of the window, said retaining strip comprising a first generally planar arm, adhesive means for adhering said first arm to such opposed peripheral transverse surfaces of the window adjacent the glass, a second arm extending at an acute angle to the first arm, and having an arch at the distal end thereof for gripping the groove in the grille, and resilient connection means between said first and second arms for urging said arch on said second arm into engagement with the peripheral groove in the grille, said second arm having a generally planar portion between said resilient connection means with said first arm and said arch, said arch having a substantially uniform radius with a center of curvature substantially lying in the plane defined by said second arm.

4,586,307

PREFABRICATED CEILING ELEMENT FOR CEILINGS IN BUILDINGS

Ulrich Fiergolla, Schillerstr. 8, (4992) Espelkamp, and Josef Rottmayr, Eduard-Schmid-Str. 26, (8000) Muenchen 90, both of Fed. Rep. of Germany

PCT No. PCT/DE80/00104, § 371 Date Mar. 5, 1981, § 102(e) Date Mar. 5, 1981, PCT Pub. No. WO81/00272, PCT Pub. Date Feb. 5, 1981
PCT Filed Jul. 18, 1980, Ser. No. 253,505
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1979, 2929350
Int. Cl.[4] E04B *1/04*; E04C *3/30*
U.S. Cl. 52—334 **8 Claims**

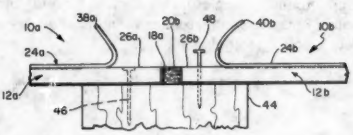
1. In a prefabricated ceiling element for ceilings in buildings, having a concrete ceiling panel with reinforcing rods embedded in said concrete ceiling panel which has a substantially uniform thickness throughout its given length and at least one steel girder extending in the longitudinal direction of the ceiling panel, said steel girder having a T-cross-section with a web having projecting tips and substantially triangular cutouts between the tips so that the tips of the steel girder webs are anchored in the concrete ceiling panel, said steel girder having a given height below the ceiling panel so that the thickness of said ceiling panel plus the given height of the steel girder make up the structural height of the ceiling element, the improvement comprising a steel girder length, which extends in the longitudinal direction of said concrete ceiling panel, said steel girder length being shorter than said given length of said concrete ceiling panel whereby a spacing is provided between each of the short ends of the concrete ceiling panel and each respective end of said steel girder, each said spacing being bridged by a panel end portion having a length in said longitudinal direction corresponding at least to said entire structural height of the ceiling element, and wherein the concrete ceiling panel end portions with the reinforcing rods embedded therein are completely free of any portions of said steel girder, said panel end portions bridging an installation zone in which all forces are taken up by the concrete ceiling panel and said reinforcing rods embedded therein.

4,586,308

WALL PANEL

Harriet E. Jennings, Westport, Conn., assignor to U.S. Plywood Corporation, Wilton, Conn.

Filed Jun. 3, 1985, Ser. No. 740,820
Int. Cl.[4] E04B *1/62*
U.S. Cl. 52—393 **12 Claims**



1. A generally rectangular planar panel comprising:
a generally rectangular substrate having opposed parallel top and bottom edges and opposed parallel first and second side edges;
a strip of resilient material adhered to the second edge of said substrate; and
a generally rectangular face layer adhered to portions of said substrate inwardly spaced from the first and second edges thereof, said face layer including opposed top and bottom edges and a first side edge which are disposed respectively substantially in register with the top, bottom and first side edges of said substrate, said face layer further including a second side edge overhanging the strip of resilient material adhered to the second side edge of said substrate, whereby portions of said face layer adjacent said first and second side edges of said substrate can be lifted away from the substrate.

4,586,309

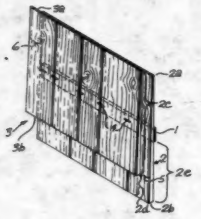
TWO-COURSE SHINGLE PANEL

Stewart Ferguson, P.O. Box 376, Pacific Beach, Wash. 98571

Filed Mar. 30, 1984, Ser. No. 595,076
Int. Cl.[4] E04D *1/00*
U.S. Cl. 52—540 **7 Claims**

1. A shingle panel comprising only two courses of wood sawn tapered random width shingles in edge-to-edge relationship composed of an undercourse of longer shingles and an upper outer course of shorter shingles much shorter than said longer shingles, the shingles in at least one of said courses being arranged with their tips substantially even for defining the upper edge of the shingle panel and with the butts of said upper outer course shingles spaced a substantial distance from the

butts of said undercourse shingles to provide an undercourse weather exposure interval of substantial width between the butt ends of said longer undercourse shingles and the butt ends of said shorter upper outer course shingles, and said undercourse shingles and said upper outer course shingles being arranged in break joint relationship, a cleat much narrower than the vertical panel width, having its length extending lengthwise of said undercourse and of said upper outer course and disposed at the side of said undercourse opposite said upper outer course with its lower edge spaced from the upper



edge of the shingle panel a distance establishing the distance which the butt portions of said undercourse shingles will overlie the tip portions of said shorter outer upper course shingles in the next lower panel of a roof or wall structure of similar construction when the lower edge of said cleat abuts the upper edge of such next lower panel, and securing means extending through said shorter upper outer course shingles and said longer undercourse shingles into said cleat for integrating said upper outer course shingles, said undercourse shingles and said cleat into a unitary shingle panel.

4,586,310

ANGLED ASSEMBLY OF PROFILES FOR TONGUE AND GROOVE FITTING AND KEY LOCKING

Jacques Baril, La Murette, and Georges Chailleux, Chevry-Cossigny, both of France, assignors to Cegedur Societe de Transformation de l'Aluminium Pechiney, Paris, France

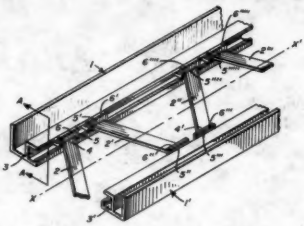
PCT No. PCT/FR82/00210, § 371 Date Jul. 31, 1984, § 102(e) Date Jul. 31, 1984

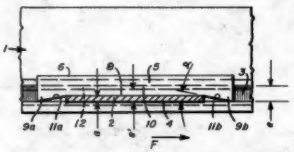
PCT Filed Dec. 13, 1982, Ser. No. 638,477

Int. Cl.[4] E04B *1/58*

U.S. Cl. 52—766 **10 Claims**

1. An assembly comprising a first structural member having an elongate groove defined therein, and two insert components, at least portions of which are closely received in said groove, said two insert components comprising a second structural member and a key member, said portions include a groove-received tongue portion on said second member and a groove-received side portion on said key member, one of said groove-received portions being of a greater width, lengthwise along the groove, than the other groove-received portion, the wider of said portions having a surface generally concave along the width thereof to define opposed edge areas on the greater width portion which are of greater thickness than the central area of the greater width portion for positioning beyond the opposed side edges of the other groove-received





portion, whereby lengthwise movement of the portions along the groove is precluded.

4,586,311

APPARATUS FOR REMOVING STRIPS OF PHOTOSENSITIVE MATERIAL FROM FLAT ENVELOPES

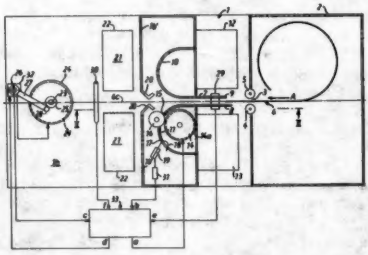
Walter Becherer, Munich; Erwin Geyken, Neubiberg; Nikolaus Jelinek, Munich; Franz Lechner, Grafing, and Helmut Schausberger, Munich, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 25, 1983, Ser. No. 498,132

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1982, 3221220

Int. Cl.[4] B65B *43/26*

U.S. Cl. 53—381 R **29 Claims**



1. Apparatus for removing strips, particularly strips of photosensitive material, from flat envelopes each having an open front end, and first and second panels which flank a strip in the envelope and are connected to one another along marginal portions of the strip, said apparatus comprising substantially blade-like first and second tools insertable through the open end of an envelope so as to penetrate between the respective panels and the strip in the envelope; transporting means for effecting relative movement of the tools and the envelope so that the tools penetrate into the envelope; and severing means

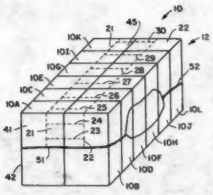
for cutting the envelope open along at least one marginal portion of the strip in the course of relative movement of the envelope and the tools while the latter are disposed between the respective panels and the strip.

4,586,312

METHOD FOR PRODUCING HEAT SHRINKABLE PACKAGE WITH A FRANGIBLE ACCESS PANEL

Jean-Louis Limousin, Clearwater, Fla., assignor to Pet Incorporated, Fenton, Mo.

Filed Apr. 2, 1984, Ser. No. 595,581
Int. Cl.[4] B65B *61/18*
U.S. Cl. 53—412 **3 Claims**



1. The method of providing a heat shrinkable package with a plurality of frangible access panels for a plurality of articles arranged in an array, comprising the steps of:

providing a first and a second web of heat shrinkable plastic material with the first web being immediately adjacent the conveyor;

perforating the first web with plural longitudinal perforations extending along the length of the first web and further perforating the first web with transverse intermittently-spaced perforations extending between the plural longitudinal perforations to define the frangible access panels therebetween;

heat sealing the first web to the second web to create a first seam;

draping the articles between the first and second webs;

heat sealing the first web to the second web to create a second seam with the articles enclosed therein; and

passing the articles through a heat shrink oven on the conveyor for shrinking the first and second webs with the first web being immediately adjacent the conveyor and while providing only limited heating of the first web adjacent the conveyor for preventing severing of the first web along the perforations thereby enabling the desired number of access panels to be removed without destroying the mechanical package for holding the plurality of articles in an array.

4,586,313

METHOD FOR PACKAGING BULK MATERIALS COMPOSED OF ELONGATED PIECES

Steven C. Maglecic, 4041 S. Mitchell, Boise, Id. 83709

Filed Feb. 15, 1985, Ser. No. 702,353
Int. Cl.[4] B65B *1/22, 9/20*
U.S. Cl. 53—437 **11 Claims**

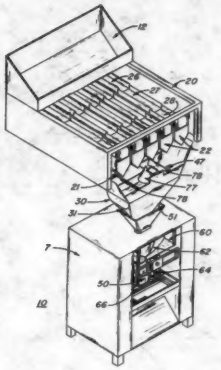
1. A method of aligning and packaging bulk materials composed of elongated pieces, which comprises:

measuring a pre-selected amount of the material;

substantially separating the material into individual pieces by free fall;

causing the pieces to free-fall for partial vertical alignment thereof;

guiding the free falling pieces into a fill tube for alignment thereof;



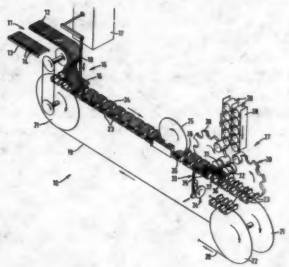
collecting the pieces within the fill tube; and packaging the material so collected in selected packaging material.

4,586,314

FILLING METHOD AND APPARATUS

William A. Monge, St. Charles, and Joseph M. Cerra, Orland Park, both of Ill., assignors to Nestec S.A., Vevey, Switzerland

Filed Oct. 30, 1984, Ser. No. 666,618
Int. Cl.[4] B65B *5/06, 35/30*
U.S. Cl. 53—444 **23 Claims**



1. A process for filling rod-shaped objects into a cylindrical container comprising:

(a) supporting a group of seven parallel rod-shaped objects in two adjacent rows having a substantially trapeziform configuration in cross-sectional outline, one row having four objects and one row having three,

(b) rearranging the group of objects into a substantially hexagonal configuration by forcing the group of objects into and through a funnel, the funnel having a gradual transition in internal cross-sectional outline from substantially trapeziform at the inlet, to substantially hexagonal at the outlet, and guiding, within the funnel, the middle object of the row of three to a central position parallel to the other rod-shaped objects such that the outer objects of the row of three and the objects of the row of four are rearranged and are substantially equally spaced surrounding the circumference of the middle object in the central position, the rearranged objects defining in cross-sectional outline a substantially hexagonal configuration, and

(c) forcing the rearranged group of seven objects from the funnel outlet into the container.

4,586,315

APPARATUS FOR INTRODUCING STACKS OF PAPER LAYERS INTO CARTONS

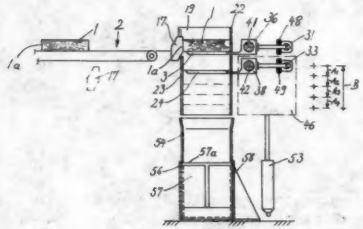
Wolfram Wolf, Bilsen, Fed. Rep. of Germany, assignor to E.C.H. Will (GmbH & Co.), Hamburg, Fed. Rep. of Germany

Filed Jul. 16, 1984, Ser. No. 630,928

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1983, 3325378

Int. Cl.[4] B65B *35/50, 39/12*

U.S. Cl. 53—447 **13 Claims**



1. Apparatus for accumulating stacks of sheet-like commodities in containers of the type having an open side, comprising a platform; means for moving said platform between an operative position in which the platform can support a commodity and an inoperative position in which the platform allows a commodity thereon to descend by gravity; an elevator disposed below said platform; means for moving said elevator up and down nearer to and further away from said platform; means for positioning discrete containers below said elevator so that the open side of the container below said elevator faces upwardly; means for moving said elevator between an intercepting position in which the elevator can receive a succession of commodities in response to repeated movements of said platform to inoperative position and a releasing position in which the stack of commodities which have accumulated on said elevator in response to repeated movements of said platform to inoperative position is free to descend into the container therebelow; and means for feeding commodities seriatim onto the platform while the latter assumes said operative position.

4,586,316

METHOD AND APPARATUS FOR FORMING PACKS OF ARTICLES

Erik E. Backman, Gothenburg; Ulf A. Henrekson, Kungalv, and Inge L. Nertman, Kungälv, all of Sweden, assignors to Aktiebolaget Volvo, Sweden

Division of Ser. No. 55,428, Jul. 6, 1979, Pat. No. 4,319,684. This application Mar. 5, 1982, Ser. No. 354,954

Claims priority, application Sweden, Jul. 7, 1978, 7807628

The portion of the term of this patent subsequent to Mar. 16, 1999, has been disclaimed.

Int. Cl.[4] B65B *11/58*

U.S. Cl. 53—449 **2 Claims**

1. A method for forming and filling packs of articles, comprising the steps of :

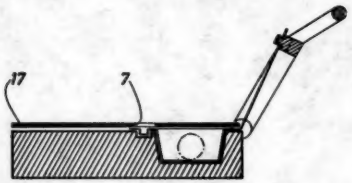
forming a multiple unit in the shape of an elongate member having a plurality of corresponding receptacle parts and receptacle closing parts formed in one common piece, the receptacle parts being a row of recesses in the elongate member and the receptacle closing parts being foldable against the receptacle parts along a common folding line, the receptacle parts and closing parts being connected in registered alignment with one another and positioned side by side so as to form adjacent rows of same parts extending from end to end of the elongate member, the length of the elongate member being a multiple of the width of a finished pack;

pressing a row of male parts and a row of female parts out of the elongate member at corresponding positions such that upon folding the elongate member along the folding line the male parts are engaged in the female parts for holding the receptacle parts and closing parts together;

positively positioning each elongate member in an apparatus including location means of corresponding shape, for the purpose of filling the elongate member with articles, with all recesses of the receptacle parts facing upwards;

filling all the receptacle parts of the elongate member with articles in one operation;

prior to closing the receptacle parts, forming a sheet member



of length corresponding to the elongate member and having openings located to correspond to the male parts and the female parts, and bringing the sheet member against the elongate member over one of the receptacle parts or closing parts;

closing all receptacle parts in the elongate member in one operation using the apparatus, by positioning the connected closing parts of the member over the recesses of the respective receptacle parts, when folding said closing parts to a position over the receptacle parts, the sheet member being held between the receptacle parts and the closing parts, the male parts and female parts engaging through the openings in the sheet member; and thereafter,

dividing the elongate member into separate packs by laterally separating the elongate member and the sheet member along predetermined lines.

4,586,317

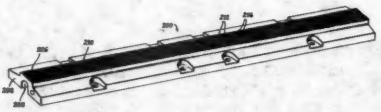
MINUTELY CROSS CHANNELED VOIDING SEALING SYSTEMS

Clifford J. Bussell, Morton Grove, Ill., assignor to Kraft, Inc., Glenview, Ill.

Filed Oct. 31, 1983, Ser. No. 546,885

Int. Cl.[4] B65B *51/26, 51/30*

U.S. Cl. 53—451 **3 Claims**



1. A method for cross sealing of a packaging material tube through an intermediate layer of plastic comestible comprising the steps of

providing a longitudinally continuous body of the plastic comestible to be packaged which is continuously surrounded by a packaging film comprising a plurality of at least two layers including an inner sealing layer of relatively low thermoplastic melt temperature, and an outer

layer which does not melt under sealing conditions to provide a film tube wrapped comestible,

transversely compressing said film tube between a rigid, minutely cross channeled sealing surface having a cross channel density of at least about 15 channels per inch, said channels having a depth in the range of from about 0.005 inch to about 0.020 inch and a width in the range of from about 0.01 inch to about 0.03 inch, and said channels providing therebetween a density of at least about 500 discrete sealing surfaces per square inch comprising at least about 30 percent of the total surface area of said cross channeled sealing surface, and an elastomeric voiding surface at a pressure in the range of from about 150 to about 600 pounds per square inch to displace the comestible from the zone between the channeled sealing surface and the elastomeric voiding surface, whereby the elastomeric voiding surface forces the packaging material at least partially into the channels of the minutely channeled cross sealing surface to stretch the film and to pump the comestible along the channels into the package zone adjacent the cross-channeled sealing surface, and to cross seal the internal surfaces of the packaging material, and

severing the film tube at the cross seal.

4,586,318

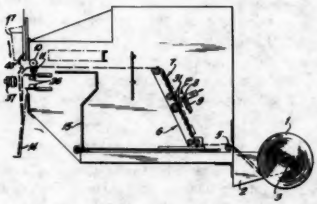
BAG FORMING AND BAGGER APPARATUS AND METHOD

Irving L. Litt, Rockvill Centre, and Jose Torres, Ridgewood, both of N.Y., assignors to All Packaging Machinery & Supplies Corp., Ronkonkoma, N.Y.

Filed Dec. 22, 1983, Ser. No. 564,253

Int. Cl.[4] B65B *7/06, 9/13, 43/36*

U.S. Cl. 53—459 **16 Claims**



1. In a method of continuously forming and filling plastic film bags which comprises the steps of successively providing a continuous length of tubular plastic film of pre-selected width, transversely slitting only the topside of the film at pre-determined intervals lengthwise of the film, moving the slitted film into a bag forming and filling station, forming the plastic film successively into a plurality of open top bags, filling each bag with the desired material through the opening formed by the slitting step, the improvement comprising substantially simultaneously performing all of the following steps at the same location in the bag forming and filling station before it is moved from the station; the steps of sealing off the top of each filled bag, sealing off the bottom of the next bag to be filled, cutting away the material between the seals, removing the cut away material before advancing the film for the next filling step while removing the previously filled and sealed bag from the bag forming and filling station.

4,586,319

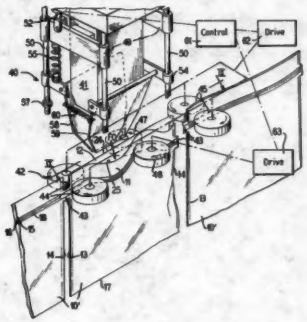
METHOD OF AND MEANS FOR EASY OPENING BAGS

Steven Ausnit, New York, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Continuation-in-part of Ser. No. 430,944, Sep. 30, 1982, Pat. No. 4,479,244. This application Jun. 15, 1984, Ser. No. 620,836

Int. Cl.[4] B65B *3/04*

U.S. Cl. 53—468 **21 Claims**



1. The method of opening a bag top closed by reclosable interlocked rib and groove elements extending between opposite side edges of the bag along the confronting faces of the bag walls at the bag top, which comprises the steps:

applying longitudinal force adjacent one of the bag side edges to at least one of the rib and groove elements while holding the rib and groove elements adjacent to the other of said side edges and tending to slide said rib and groove elements relatively; and

thereby effecting curling of said at least one of the rib and groove elements and separation of the elements from their interlocked relation due to the resultant component of force in a direction tending to separate the rib and groove elements.

4,586,320

PACKING APPARATUS

Takao Takai; Fumio Okada; Hiroyoshi Odawara, and Fukumatsu Mitogawa, all of Onomichi, Japan, assignors to Furukawa Mfg. Co., Ltd., Tokyo and Furukawa Kogyo Co., Ltd., Hiroshima, both of, Japan

Filed Jun. 8, 1984, Ser. No. 618,669

Claims priority, application Japan, Jun. 9, 1983, 58-103936

Int. Cl.[4] B65B *31/02*

U.S. Cl. 53—512 **5 Claims**

1. A rotary packing apparatus comprising:

a plurality of bag-support elements disposed peripherally at a constant pitch along a substantially circular endless path, said bag-support elements for supporting flexible bags in suspension, such that openings in said bags are oriented upwardly;

a conveying means for intermittently conveying said bag-support elements along said path at a same pitch as said pitch of said bag-support elements, said bag support elements respectively comprising plates supported by said conveying means;

a bag-feed means for intermittenly feeding said bags to the bag-support elements adjacent to said conveying means;

a filling means for filling objects into said bags through said openings;

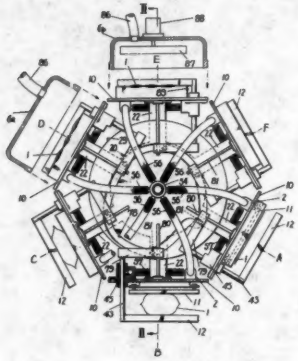
a sealing means for sealing said opening portions of said bags;

a vacuum pump;

a first chamber member and a second chamber member each disposed outside and adjacent to said path, said first cham-

ber member being disposed between said filling means and said sealing means, said second chamber member being disposed at said sealing means, said first chamber member and said second chamber each being disposed at a position at which said bag-support elements are stopped intermittently by said conveying means, said first and second chamber members being disposed opposite to a pair of said plates supported by said conveying means when said bag-support elements are stopped intermittently;

means for moving said first and second chamber members to contact said pair of plates to form first and second vacuum chambers therewith and for moving said first and second chamber members away from said pair of plates to open



said first and second vacuum chambers to atmosphere, said first and second vacuum chambers being in fluid communication with said vacuum pump for creating a vacuum in said bags; and

means cooperating with said vacuum pump for (i) subjecting said bags supported by said bag-support elements to a first vacuum inside said first vacuum chamber disposed in an initial position relative to a direction in which said bag-support elements are conveyed, (ii) subsequently opening said first vacuum chamber to atmosphere, and (iii) thereafter subjecting said bags to a second vacuum inside said second vacuum chamber provided behind said first vacuum chamber relative to said direction in which said bag-support elements are conveyed.

4,586,321

APPARATUS FOR AUTOMATICALLY INSERTING TRANSPARENCIES INTO ONE PIECE FRAMES

Gianluigi Costa, Valdagno, Italy, assignor to Tecnodia, s.r.l., Valdagno, Italy

Filed Oct. 7, 1983, Ser. No. 539,798

Claims priority, application Italy, Oct. 8, 1982, 84144 A/82

Int. Cl.[4] B65B *63/00*

U.S. Cl. 53—520 **7 Claims**

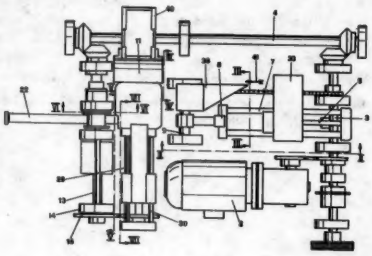
1. An apparatus for automatically inserting transparencies into open one-piece plastics frames and for folding said frames to enclose said transparencies, characterized by comprising:

a feeder for the open frames (**10**) said frames comprising first and second half frame portions joined at a hinge, which are withdrawn one by one from a store (**33**) said first and second half frame portions being in the same plane in said store and moved toward a gripper (**26**) along a sliding surface (**7**) comprising a horizontal guide slot (**36**) for an outer edge of said first half frame which is parallel to that edge at which it is hinged to the other half frame, and a member (**37**) acting on a second edge of the first half frame in order to prevent it rising during the folding stage,

a deviator element (**38**) positioned alongside the sliding surface (**7**) and on the same side as the free second half frame and partially interfering with said second half frame during the frame feed, to cause it to rotate about the axis along which it is hinged to the first half frame, and to thus dispose it in a position suitable for the closure of said frame,

a feeder for the film (**20**), including a sliding surface (**19**) along which the film is fed and which is at a level above and aligned with the sliding surface (**7**) for the frames (**10**), the direction of feed of said film being opposite to the direction of feed of the frames, said feeder for the film feeding a portion of the film to project past the downstream end of said film sliding surface,

a cutter (**18**) positioned at the downstream end of the sliding surface (**19**) for the film (**20**) in order to cut projecting transparencies and to drop them onto respective first half frames,



a closure device for folding the second half frame over and onto the transparancy and first half frame to enclose the transparency,

a gripper (**26**) interposed between the sliding surface (**7**) for the open frames (**10**) and the sliding surface (**19**) for the film (**20**) and which is provided with a fixed jaw (**27**) and a mobile jaw (**27'**), means for moving said gripper orthogonally to the feed direction of the frames and film from a waiting position to a working position and then further to the closure device, means for opening said gripper to receive said frame and transparency at said waiting position and for closing said gripper to retain the first half frame of the frame (**10**) and the transparency and to convey them to a frame closure device.

4,586,322

GRASS TRIMMER

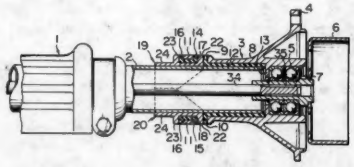
Yoetsu Yokocho, Ome, and Hiroyuki Tanaka, Tanashi, both of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Mar. 21, 1985, Ser. No. 714,521

Claims priority, application Japan, Mar. 29, 1984, 59-45356[U]

Int. Cl.[4] A01G *3/06;* **A01D** *34/63*

U.S. Cl. 56—12.7 **1 Claim**



1. In a grass trimmer of the type having a support which supports a portion of a control rod on the side thereof which is closer to a prime mover in such a manner that said portion is received inside said support and which rotatably supports an

output shaft of a clutch for coupling a transmission shaft received inside said control rod,

an improvement characterized by comprising:

an integral tubular support;

a vibration damping sleeve received inside said support;

projecting portions formed on the outer peripheral surface of said sleeve and respectively engaged with bores formed in a peripheral wall portion of said support;

a pair of semi-cylindrical fixing members which in combination form a single cylindrical member, said semi-cylindrical fixing members being inserted into the inside of said sleeve from its control rod insertion end side, each of said fixing members having cut away portions formed on both sides of its insertion end portion and further having on its outer peripheral portion a projecting portion which is engageable with a bore formed in the corresponding one of said projecting portions of said sleeve,

wherein said prime mover-side portion of said control rod is inserted into the space defined by said fixing members, and the respective outer exposed ends of said fixing members are clamped together, thereby securing said control rod to said support.

4,586,323

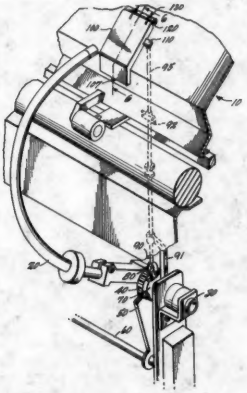
NOISE CONTROL SYSTEM FOR TEXTILE MACHINERY

B. Dean Lassiter, Greensboro; Vernon T. Daniel, Oak Ridge, and John H. Sumner, Greensboro, all of N.C., assignors to Burlington Ind., Inc.

Filed Dec. 7, 1984, Ser. No. 679,284

Int. Cl.[4] D01H *1/00, 5/28, 15/00*

U.S. Cl. 57—1 R **19 Claims**



1. A noise control system for reducing the level of noise emanating from a jet chamber of a textile machine, said textile machine including a traversing knotter which includes a yarn suction tube which enters said jet chamber whenever a threading-up operation is required, said system comprising:

an acoustical door for substantially covering said jet chamber in order to reduce the level of noise emanating from said jet chamber;

means for detecting when a threading-up operation is required and for outputting an actuating signal;

means for opening said acoustical door; and

activating means for driving said opening door means in response to said actuating signal.

8. A noise control system for an air jet spinning machine including at least one air jet, contained within a jet chamber, and a traversing knotter having a yarn suction tube, which periodically enters the jet chamber to thread-up a yarn when a shaft of the traversing knotter is rotated to a first position, said yarn suction tube being withdrawn from the jet chamber when said shaft is rotated to a second position, said system comprising:

an acoustical door for substantially covering said jet chamber in order to reduce the level of noise emanating from said air jet spinning machine, said door being attached by a hinge to said air jet spinning machine and having a projecting lifting tab for opening said door;

a cam mounted on said rotatable shaft of said traversing knotter; and

a first rod having a cam follower at one end which abuts on said cam, said first rod being carried by said traversing knotter;

a second rod engaged at one end with the other end of said first rod and the other end of said second rod being positioned for engagement with said lifting tab of said door, wherein said cam causes said first and second rods to open said door by moving said first and second rods upwardly against said lifting tab whenever said shaft is being rotated to said first position and wherein said door is maintained in a closed position whenever said shaft is rotated to said second position.

4,586,324

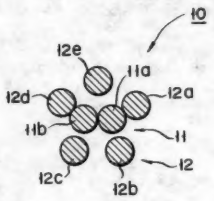
METAL CORD FOR REINFORCING RUBBER PRODUCTS

Kaoru Mizuma, Kitakami, Japan, assignor to Tokyo Rope Mfg. Co., Ltd., Tokyo, Japan

Filed Dec. 31, 1984, Ser. No. 687,633

Int. Cl.[4] D02G *3/48;* **D07B** *1/06;* **B60C** *9/00*

U.S. Cl. 57—212 **8 Claims**



1. A metal cord for use as a reinforcement for rubber products, comprising:

a strand core comprising a plurality of metal wires stranded with eath other; and

a strand layer comprising a plurality of metal wires stranded around the strand core, the wires forming the strand layer being stranded at a pitch two times that of the wires which form the strand core;

wherein the number of the metal wires which form the strand layer is less than 4 plus the number of the metal wires which form the strand core, and wherein each of the metal wires which form both the strand core and layer has substantially the same diameter, so that a space is provided between the wires forming the strand layer for enabling rubber permeability of the cord.

4,586,325

METHOD AND DEVICE FOR PIECING ON A THREAD IN FRICTION SPINNING MACHINES

Heinz-Georg Wassenhoven, Monchen-Gladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Monchen Gladbach, Fed. Rep. of Germany

Filed May 10, 1985, Ser. No. 733,217

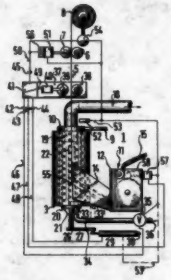
Claims priority, application Fed. Rep. of Germany, May 10, 1984, 3417308

Int. Cl.[4] D01H *15/00, 7/885, 7/892*

U.S. Cl. 57—263 **18 Claims**

1. Method for piecing on a thread in friction spinning ma-

chines, having at least one friction surface with a perforated wall defining a spinning wedge at the wall, which comprises moving the friction surface, eliminating the movement of transport air through the perforated wall of the friction surface, supplying fibers to the spinning wedge, sucking away the



fibers, subsequently moving a thread to be pieced on into the spinning wedge, resuming suction of transport air through the perforated wall of the friction surface, ending suction of the fibers, and continuously withdrawing the thread from the spinning wedge.

4,586,326

SPINNING MACHINE WITH ROVING-BOBBIN FEEDER

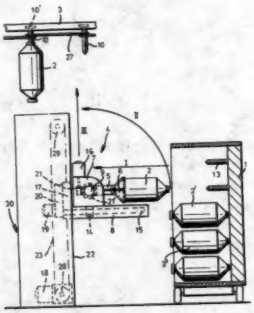
Wolfgang Igel, Ebersbach, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Ebersbach, Fed. Rep. of Germany

Filed Nov. 7, 1983, Ser. No. 549,690

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1982, 3240822

Int. Cl.[4] D01H *9/18, 9/02*

U.S. Cl. 57—281 **11 Claims**



1. In a spinning machine, the combination of:

an elongate bed provided with a multiplicity of working positions wherein rovings are produced in a preparatory stage;

an overhead guide rack extending alongside said bed;

grippers depending from said rack;

active bobbins mounted on said grippers, said rovings being drawn from said bobbins;

a stationary service unit disposed adjacent said bed;

a carriage provided with retaining means for transporting roving-laden replacement bobbins from said preparatory stage to a position adjoining said service unit; and

transfer means on said service unit programmed to pick up at least one replacement bobbin at a time from said retaining means and to deliver same to one of said grippers, each of said grippers being movable along said guide rack to any of a plurality of storage areas in the vicinity of said working positions.

4,586,327

SZ STRANDING METHOD AND APPARATUS

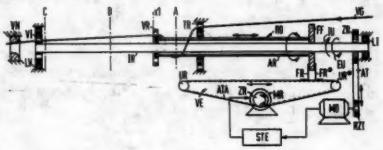
Ulrich Oestreich, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Feb. 8, 1985, Ser. No. 699,951

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1984, 3404638

Int. Cl.[4] D07B *3/00;* **H01B** *13/04;* **G02B** *5/14*

U.S. Cl. 57—294 **28 Claims**



1. In a method of SZ stranding for skein-like stock by providing a stranding nipple and a tubular store having an axis, alternately rotating the tubular store on its axis in a first direction and then a second direction and conducting the stock along the outside of the tube store with a changing lay number as the stock moves through the stranding nipple, the improvements comprising reducing the accumulation of backtwist on the stock by moving the tubular store along an axial direction from an initial position through a midpoint to a final position closely adjacent the stranding nipple in a repeating cycle having three portions with the first portion of the cycle moving the tubular store from an initial position to the midpoint and rotating the tubular store in one of the first and second directions to accumulate lays on the tubular store, the second portion of the cycle including reversing the direction of rotation of the tubular store to the other of the first and second directions as the tubular store reaches the midpoint of travel to start to decrease the number of lays accumulated on the tubular store as it moves axially toward the final position and the third portion of the cycle including upon reaching the final position quickly shifting the tubular store in the opposite axial direction to the initial position to repeat the cycle.

4,586,328

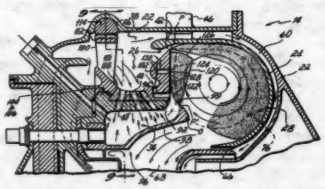
COMBUSTION APPARATUS INCLUDING AN AIR-FUEL PREMIXING CHAMBER

Werner E. Howald, 5970 Crabtree La., Cincinnati, Ohio 45243

Continuation of Ser. No. 93,260, Nov. 13, 1979, abandoned, which is a continuation of Ser. No. 877,897, Feb. 15, 1978, abandoned, which is a division of Ser. No. 707,326, Jul. 21, 1976, Pat. No. 4,084,371, which is a continuation of Ser. No. 491,611, Jul. 24, 1974, abandoned. This application May 11, 1982, Ser. No. 377,128

Int. Cl.[4] F02C *9/00;* **F02G** *3/00*

U.S. Cl. 60—39.29 **19 Claims**



1. A combustor for generating a hot gas stream by the com-

bustion of fuel in a pressurized airstream, said combustor comprising:

a housing;

an arcuate combustor liner mounted within said housing in spaced relation thereto effective to constrain the gas flow to form a generally toroidal-shaped combustion zone;

an annular air-fuel premixing chamber defined by a first annular baffle and a second annular baffle disposed radially inwardly thereof, said chamber having an upstream end and opening downstream into said combustion zone through an opening defined by said baffles;

said first baffle comprising a stationary member and a sleeve member movable relative to said stationary member, each of said members having a plurality of spaced openings therein angled generally tangentially to the inner surface thereof, said sleeve member being movable between a full open position wherein said openings are aligned, a closed position wherein said openings are offset and a plurality of partially open positions therebetween, thereby controlling the flow of air therethrough;

means for injecting fuel into said premixing chamber;

means integral with said sleeve member for moving said sleeve member relative to said stationary member;

a compressed air inlet plenum surrounding said premixing chamber and separated therefrom by said first baffle, said plenum communicating with said premixing chamber through said openings to provide for the entry of air to generate a vortical flow of a substantially homogeneous vapor phase air-fuel premixture axially of said premixing chamber;

said plenum further communicating with said combustion zone through an orifice outwardly circumferential of said sleeve member at the downstream end thereof and defined by said sleeve member and said liner providing for the entry of a main airstream into said combustion zone adjacent to the outer periphery thereof;

the vortical discharge from said premixing chamber entering said main airstream generally tangentially thereto and being mixed therein to generate a combustible air-fuel mixture for burning in said combustion zone.

4,586,329

ANTI ROTATION DEVICE

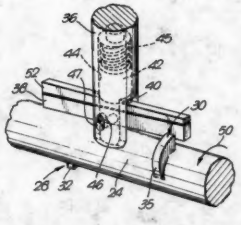
Robert N. Carlin, Nottingham, England, assignor to Rolls-Royce Limited, London, England

Filed Dec. 26, 1984, Ser. No. 686,412

Claims priority, application United Kingdom, Feb. 14, 1984, 8403818

Int. Cl.[4] F02K *3/02*

U.S. Cl. 60—226.2 **4 Claims**



3. A gas turbine engine comprising: a cowl having a fixed portion and a translatable portion, said translatable portion covering a reverser cascade, a shaft positioned in said fixed cowl portion, said shaft being rotatable to translate said translatable cowl portion and uncover said reverser cascade, anti-rotation mechanism carried in said fixed portion of said cowl for preventing rotation of said shaft to translate the translatable cowl portion to uncover said reverser cascade, said mechanism including an abutment on said shaft, said abutment having a flat face facing in one direction of rotation of said shaft, a rod movably supported in said fixed structure, said rod having an axis normal to an axis of said shaft and having one end spaced from said shaft by a variable distance, said one end of said rod having a bore therein and a slot therein, a piston slidably mounted in said bore, a first bar pivotally connected to said piston by a cooperating pin and slot arrangement, said first bar extending transversely of said rod within said slot in said one end of said rod for limited pivotal movement and for simultaneous reciprocatory movement axially of said rod into and out of the rotary path of said abutment, and resilient means positioned within said bore and acting on said piston to urge said first bar in one direction axially of said rod.

4,586,330

CONTROL SYSTEM FOR HYDRAULIC CIRCUIT APPARATUS

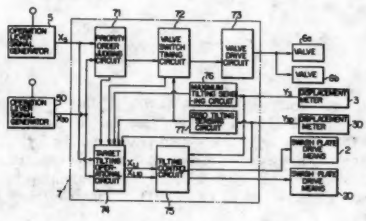
Hiroshi Watanabe; Eiki Izumi; Yukio Aoyagi; Kazuo Honma, and Kichio Nakajima, all of Ibaraki, Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Filed Jul. 23, 1982, Ser. No. 401,304

Claims priority, application Japan, Jul. 24, 1981, 56-115311

Int. Cl.[4] F16H *59/46*

U.S. Cl. 60—421 **6 Claims**



1. A hydraulic circuit system comprising:

a hydraulic circuit apparatus having at least first and second variable displacement hydraulic pumps, at least first and second hydraulic actuators driven by the first and second pumps, hydraulic connections connecting said first hydraulic actuator with said first and second pumps and said second hydraulic actuator with said second pump, and valve means for controlling the hydraulic connections between the second pump and the first and second actuators; and

control means associated with said first and second pumps and said valve means for controlling the displacement volumes of the first and second pumps and said hydraulic connections to thereby control the operations of said first and second actuators, said control means including;

means setting order of priority of the hydraulic connections between the first actuator and the first and second hydraulic pumps and an order of priority of the hydraulic connections between the second hydraulic pump and the first and second actuators;

means for sensing the displacement volume of the first hydraulic pump;

first means for sensing maximization of the sensed displacement volume of the first hydraulic pump;

means for sensing the displacement volume of the second hydraulic pump;

second means for sensing that the second displacement volume of the second hydraulic pump has become substantially zero; and

means for deciding target displacement volumes of the first and second hydraulic pumps based on information supplied at least by said priority order setting means and said first and second sensing means such that when the flow rate of hydraulic fluid supplied to the first actuator is increased, the displacement volume of the second hydrau-

lic pump is increased from substantially zero after the displacement volume of the first hydraulic pump is maximized and, when the flow rate of hydraulic fluid supplied to the first actuator is reduced, the displacement volume of the first hydraulic pump is reduced after the displacement volume of the second hydraulic pump has become substantially zero.

4,586,331

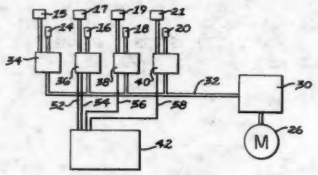
AUTOMATIC HYDRAULIC SPEED CONTROL

Donald M. Ohman, Mentor, Ohio, assignor to Caterpillar Industrial Inc., Mentor, Ohio

Continuation of Ser. No. 498,365, May 26, 1983, abandoned. This application Apr. 24, 1985, Ser. No. 710,342

Int. Cl.[4] F15B *11/02*

U.S. Cl. 60—422 **10 Claims**



1. In a work vehicle (10) having a plurality of power elements (15,17,19 and 21) and associated control elements (14,16,18, and 20), each of said power elements (15,17,19 and 21) having a respective preselected priority, and a controllable motor (26) connected to a pump (30) supplying power to said power elements (15,17,19 and 21), the improvement comprising:

said control elements (14,16,18 and 20) being connected in parallel one relative to the other;

signal means (42) for delivering a respective control signal in response to actuating respective control elements (16,18 and 20);

means (60) for receiving said control signals, selectively passing the control signal of the power element (15,17,19 and 21) requiring the slowest motor speed, and blocking all other received control signals;

converting means (62) for receiving said passed signal and delivering a preselected digital signal having a plurality of preselected magnitudes;

a special power element (15) having an associated control element (14);

special means (129) actuatable in response to the absence of control signals from the signal means (42) for delivering a plurality of preselected special digital signals of discrete preselected magnitudes responsive to incremental movement of said special control element (14); and

means (142) for controlling the speed of said pump motor (30) in response to receiving said digital signals and said special digital signals.

4,586,332

HYDRAULIC SWING MOTOR CONTROL CIRCUIT

Lawrence F. Schexnayder, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 19, 1984, Ser. No. 672,723

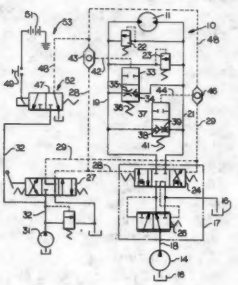
Int. Cl.[4] F15B *13/042*

U.S. Cl. 60—468 **6 Claims**

1. In a control circuit having a hydraulic motor, a pump, a directional control valve connected to the pump, and first and second motor conduits connecting the control valve with opposite sides of the hydraulic motor, said directional control valve being movable between a first position at which pressurized fluid is directed through the first motor conduit to the motor and a second position at which pressurized fluid is directed through the second motor conduit to the motor, said directional control valve having an intermediate position at which the first and second motor conduits are blocked from each other and from the pump, the improvement comprising;

a first shunt valve connected between the first and second motor conduits and being movable between a first position at which restricted communication is established therethrough in a direction from the first motor conduit to the second motor conduit and a second position at which communication through the first shunt valve is blocked;

first means for moving the first shunt valve to the second



position in response to the directional control spool being moved to the first position;

a second shunt valve connected between the first and second motor conduits and being movable between a first position at which restricted communication is established therethrough in a direction from the second motor conduit to the first motor conduit, and a second position at which communication through the second shunt valve is blocked; and

second means for moving the second shunt valve to the second position in response to the directional control valve being moved to the second position.

4,586,333

WATER ENGINE

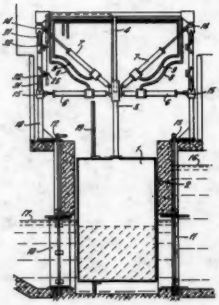
Alister U. Reid, East Horsley, England, assignor to Aur Hydropower Limited, London, England

Continuation of Ser. No. 343,910, Jan. 29, 1982, abandoned. This application Oct. 23, 1984, Ser. No. 663,877

Claims priority, application United Kingdom, Feb. 13, 1981, 8104507

Int. Cl.[4] E02B *13/12*

U.S. Cl. 60—506 **15 Claims**



1. An engine for deriving energy from a head of water,

comprising a chamber having a vertical longitudinal direction, a float mounted for up and down linear reciprocal movement within the chamber and having a central axis and occupying substantially all the chamber volume, means for alternately admitting water into the chamber from an upper water level and allowing the water to flow out from the chamber to a lower water level to cause the float to alternately rise and fall, the draft of the float and its height above the waterline in static equilibrium being greater than the difference in height between the upper and lower water levels in the chamber, and means to provide a supply of fluid under pressure comprising a piston and cylinder device operable to work on the fluid on relative movement of the piston within the cylinder, the piston and cylinder device being pivotally connected between, at a first end, a point on the float or on a member reciprocable with the float and, at a second end, a second point coupled to said chamber or to a member fixedly attached to said chamber and which is not reciprocable with the float, the second pivotal end connection being spaced from the vertical line of reciprocation of the first pivotal end connection and the central axis of said float, whereby the reciprocal movement of the float causes relative movement of the piston within the cylinder, while causing the pivotal movement of the piston and cylinder device about the second point, said first pivotal end connection being substantially aligned along the central axis of said float during said reciprocal movement of said float, said float defining a cross sectional area, said piston and cylinder device being disposed such that said first end is arranged within said area defined by said float and said second end is arranged outside said area.

4,586,334

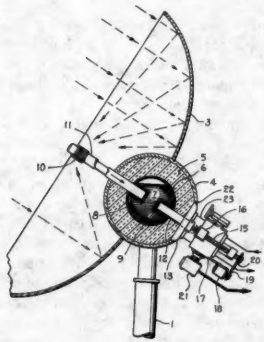
SOLAR ENERGY POWER GENERATION SYSTEM

Jack E. Nilsson, Sr., 3 Stonegate Ct., Easley, S.C. 29640, and Charles D. Cochran, 127 Andover Rd., Greenville, S.C. 29615

Filed Jan. 23, 1985, Ser. No. 693,793

Int. Cl.[4] F02G *1/06;* **F03G** *7/02;* **F01K** *3/02*

U.S. Cl. 60—524 **8 Claims**



1. A solar energy power generation system comprising:
(a) means for collecting and concentrating solar energy;
(b) heat storage means;
(c) Stirling engine means for producing power;
(d) first heat transfer means for receiving said concentrated solar energy and for transferring heat to the heat storage means; and
(e) second heat transfer means for controllably transferring heat from the storage means to the Stirling engine means and including a discharge heat pipe means for transferring heat to said Stirling engine means and further including means for inserting and withdrawing said discharge heat pipe means into and out of said heat storage means.

4,586,335

ACTUATOR

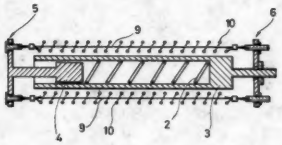
Yuji Hosoda, Ibaraki; Yoshio Kojima, Hitachi; Masakatsu Fujie; Kazuo Honma, both of Ibaraki; Taro Iwamoto, Mito; Yoshiyuki Nakano, Hitachi, and Kohji Kamejima, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 12, 1984, Ser. No. 660,239

Claims priority, application Japan, Oct. 12, 1983, 58-189292

Int. Cl.[4] F03G *7/06*

U.S. Cl. 60—528 **16 Claims**



1. An actuator comprising a drive source formed of a plurality of shape memory materials, a stationary member, a movable member forming an actuating portion of the actuator, mounted so as to be displacable relative to said stationary member, a resilient means arranged between said movable member and said stationary member for deforming a memorized shape of said shape memory materials, and wherein a plurality of shape memory materials are arranged in parallel between said movable member and said stationary member.

4,586,336

EXHAUST GAS TURBOCHARGER WITH ADJUSTABLE SLIDE RING

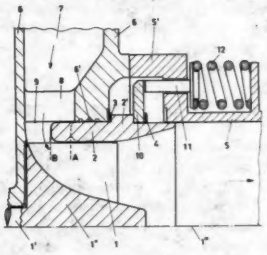
Hansulrich Hörler, Zurich, Switzerland, assignor to BBC Brown, Boveri & Co., Ltd., Baden, Switzerland

Filed Apr. 22, 1983, Ser. No. 487,830

Claims priority, application Switzerland, Apr. 29, 1982, 2609/82

Int. Cl.[4] F01D *17/08;* **F02B** *37/12*

U.S. Cl. 60—602 **9 Claims**



1. An exhaust gas turbocharger for an internal combustion engine, said exhaust gas turbocharger comprising:
(a) a turbine having rotary blades, said rotary blades defining a cylindrical volume as they rotate;
(b) an at least partially radial-flow turbine nozzle ring comprising a plurality of circumferentially spaced guide vanes sized, shaped, and positioned to cause exhaust gas to flow therebetween in a direction, said plurality of circumferentially spaced guide vanes having downstream edges which lie on an imaginary cylinder which is spaced outwardly from the cylindrical volume defined by the rotary motion of said rotary blades; and
(c) a slide ring movable in the axial direction for altering the turbine inlet flow cross-section, said slide ring extending

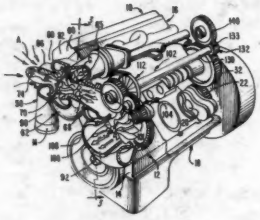
upstream between said nozzle ring and said rotary blades and being axially movable along the downstream edges of said guide vanes, said slide ring extending downstream beyond said rotary blades and having a radial internal contour which is closely spaced from the radially outer edges of said rotary blades over the entire axial travel of said slide ring and which forms the radial wall of a flow duct for exhaust gas downstream of said rotary blades.

4,586,337

TURBOCOMPOUND SYSTEM

Larry D. Fox, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Jan. 17, 1984, Ser. No. 571,660
Int. Cl.[4] F02B *37/00*; F02G *3/02*
U.S. Cl. 60—605 **8 Claims**



1. A turbocompound system for improving the performance of an internal combustion engine without substantially increasing an end viewed profile of the engine to which it is mounted in use, comprising:

(a) an exhaust driven turbocharger means having an exhaust manifold means extending in an axial direction for collecting exhaust gases from engine cylinders and delivering the gases to an outlet end thereof, exhaust turbine means for extracting energy from the exhaust gases, said exhaust turbine means being provided with an inlet connected to the outlet end of the manifold and an outlet for discharging the exhaust gases, compressor means coupled to the exhaust turbine means for providing a supply of charge air under pressure to an air outlet thereof for delivery to air intake means of an internal combustion engine in use;

(b) a power turbine means for extracting additional energy from the exhaust gases, said power turbine means having an intake connected to the outlet of the exhaust turbine means, and mounting means on a side of the power turbine means facing in a direction parallel to the axial direction of the exhaust manifold means that is constructed for being mounted, in use, on an end of an engine adjacent one end of a crankshaft of the engine; and

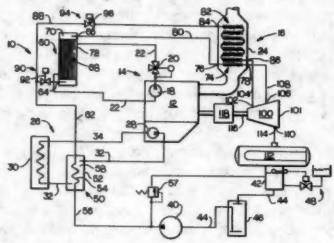
(c) coupling means connected to the power turbine means for transferring mechanical energy produced by the power turbine means, said coupling means extending from said power turbine means to a power take-off end in a direction parallel to the axial length of the exhaust manifold means by an amount that is sufficient for enabling the power take-off end to be connected, in use, to an opposite end of the engine crankshaft from said one end thereof in a manner for transferring the mechanical energy produced by the power turbine means adjacent said one end of the crankshaft to the opposite end of the crankshaft without having to pass therethrough.

4,586,338

HEAT RECOVERY SYSTEM INCLUDING A DUAL PRESSURE TURBINE

John R. Barrett, Mesa, Ariz.; Richard A. Cemenska, Edelstein, Ill.; John R. Gladden, Metamora, Ill.; Mark D. Moeckel, Peoria, Ill., and Philip H. Schneider, LaJolla, Calif., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 14, 1984, Ser. No. 671,262
Int. Cl.[4] F01K *25/00*
U.S. Cl. 60—618 **14 Claims**



1. A heat recovery system for an engine having a liquid cooling system for transferring heat energy away from the engine and an exhaust system, comprising:

a first heat exchanger having an inlet port and an outlet port and being located in heat transferring relation to the liquid cooling system;

a second heat exchanger having an inlet port and an outlet port and being located in heat transferring relation to the exhaust system;

a third heat exchanger having an inlet port and an outlet port and being located in heat transferring relation to the exhaust system;

a source of pressurized fluid connected to the first and third heat exchangers;

means for preheating the fluid from the source, said preheating means being located between the source and the first and third heat exchangers;

first means for controllably directing a portion of the preheated fluid at a preselected pressure to the inlet port of the first heat exchanger so that the preheated fluid is converted to a gas at the preselected pressure and for subsequently directing the gas from the outlet port of the first heat exchanger to the inlet port of the second heat exchanger so that the gas at the preselected pressure is superheated to a preselected temperature;

second means for controllably directing the other portion of the preheated fluid, at a preselected pressure higher than the preselected pressure of the fluid from the first means, to the inlet port of the third heat exchanger so that the other portion of the preheated fluid is converted to a gas at the higher preselected pressure and superheated to a preselected temperature higher than the temperature of the gas from the first means; and

a dual pressure turbine having a high temperature and high pressure inlet port connected to the outlet port of the third heat exchanger, a low temperature and low pressure inlet port connected to the outlet port of the second heat exchanger, an outlet port connected to a condenser adapted to convert the outlet gas to a fluid, and an output shaft adapted to transmit a working force from the dual pressure turbine in response to the superheated gases from the respective second and third heat exchangers being directed therethrough.

4,586,339

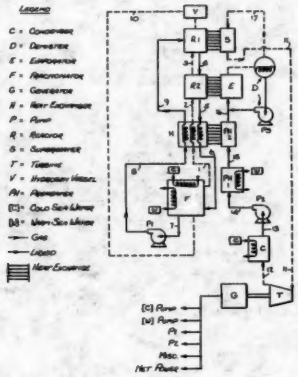
THERMAL ENERGY CONVERSION

Allen F. Reid, 4736 Reservoir Rd., Geneseo, N.Y. 14454, and Albert H. Halff, 3514 Rock Creek Dr., Dallas, Tex. 75204

Continuation-in-part of Ser. No. 350,141, Feb. 19, 1982, abandoned. This application Jul. 11, 1983, Ser. No. 512,668

Int. Cl.[4] F03G *7/04*

U.S. Cl. 60—641.7 **22 Claims**



1. In a closed Rankine cycle system for thermal energy conversion to mechanical energy and which is in communication with a body of water having differing water temperatures in spaced portions or with two bodies of water having differing water temperatures the improvement comprising the inclusion of temperature increasing means for increasing the temperature of the heat as supplied to the mechanical energy generator including means for accumulating the heat for an endothermic chemical reaction from a portion of the higher temperature water and means for releasing the heat in the reverse exothermic chemical reaction to increase the temperature of the products of said reaction above that of the higher temperature water, there being means to heat the working fluid of the Rankine cycle system from said products thereby permitting higher temperatures to be imparted to the working fluid, there being means for a partial separation of reactants from products of the endothermic chemical reaction providing one or more fractions with a concentration of reactants significantly greater than the equilibrium concentration of reactants thereby enabling the chemical reaction to proceed with absorption of heat, and there being means for providing one or more fractions with concentrations of products of the endothermic reaction greater than the equilibrium concentration of products thereby enabling the reverse chemical reaction to proceed with release of heat.

4,586,340

METHOD AND APPARATUS FOR IMPLEMENTING A THERMODYNAMIC CYCLE USING A FLUID OF CHANGING CONCENTRATION

Alexander I. Kalina, 12214 Clear Fork, Houston, Tex. 77077

Filed Jan. 22, 1985, Ser. No. 693,470

Int. Cl.[4] F01K *25/06*

U.S. Cl. 60—673 **23 Claims**

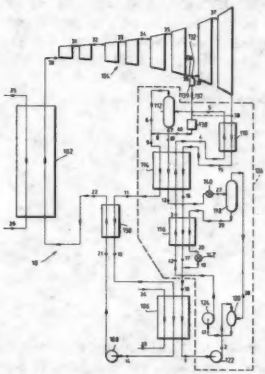
1. A method of generating usable energy comprising the steps of:

vaporizing, at an upper intermediate pressure, only part of an initial multi-component working fluid stream having lower and higher temperature boiling components to form a first vapor fraction, said first vapor fraction being enriched with said lower boiling temperature component;

mixing the first vapor fraction with part of the initial working fluid stream and absorbing it therein to produce a rich solution enriched relatively to the initial working fluid stream with respect to the lower temperature boiling component, and using a remaining part of the initial working fluid stream as a lean solution which is impoverished relatively to the rich solution with respect to the lower temperature boiling component;

increasing the pressure of the rich solution to a charged high pressure level and evaporating the rich solution to produce a charged gaseous main working fluid;

expanding the charged gaseous main working fluid to a spent low pressure level to transform its energy into usable form;



cooling and condensing the spent main working fluid by absorbing it in a lean solution at the spent low pressure level to form a distillation fluid;

increasing the pressure of the condensed fluid to a lower intermediate pressure;

forming from a part of said lean solution a second vapor fraction enriched with said lower boiling temperature component with respect to said condensed fluid;

mixing said second vapor fraction with said distillation fluid to form a mixture; and

increasing the pressure of said mixture to said upper intermediate pressure to form said initial multicomponent working fluid stream.

4,586,341

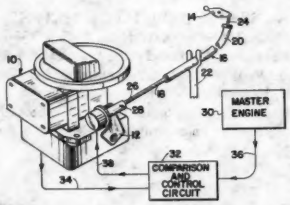
TWIN ENGINE SYNCHRONIZER

John R. Kobus, 714 Pennington St., Elizabeth, N.J. 07202

Filed May 9, 1983, Ser. No. 492,735

Int. Cl.[4] F02B *73/00*

U.S. Cl. 60—711 **37 Claims**



1. Apparatus for synchronizing the speeds of two engines, each having its own throttle lever connected by an associated cable to a respective hand throttle lever, comprising moving

means carried by said throttle lever of one of said engines for moving said throttle lever of said one engine independently of its associated cable and its respective hand throttle lever to increase or decrease the speed of said one engine until the speed of said one engine matches the speed of the other engine, whereby said moving means moves said throttle lever of said one engine to adjust the speed of said one engine without moving its associated cable or its respective hand throttle lever.

4,586,342

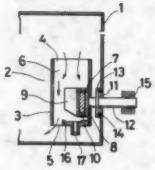
DEHUMIDIFYING AND COOLING APPARATUS

Masao Morishita, Ibaraki, and Toshimi Masuda, Kusatsu, both of Japan, assignors to Nissin Electric Co., Ltd., Kyoto, Japan

Filed Feb. 20, 1985, Ser. No. 703,287

Int. Cl.[4] F25B *21/02*

U.S. Cl. 62—3 **16 Claims**



1. A dehumidifying and cooling apparatus comprising:

a box for housing electric apparatus in which an electric element to be kept at a predetermined temperature and a low humidity may be installed, said box having an external wall;

a heat pie installed through the external wall of the box for containing a heat transferring medium, said heat pipe having a heated end located inside the box and a cooled end located outside the box;

an electronic cooling element, said electronic cooling element having a heating face and a cooling face, the heating face bine heat-conductively fixed to the heated end of the heat pipe;

cooling fins for condensing moisture and cooling the air within the box, said cooling fins being heat-conductively fixed to the cooling face of the electronic cooling element;

radiation fins for radiating heat transferred from within the box to the ambient atmosphere, said radiation fins being heat-conductively fixed to the cooled end of the heat pipe;

drainage means located inside the box beneath the cooling fins for draining water which is generated by the condensation of moisture on the cooling fins; and

a vent guide defining a ventilation passage located in the box and surrounding the cooling fins.

4,586,343

PROCESS AND DEVICE FOR METERING SMALL AMOUNTS OF A LOW BOILING LIQUIFIED GAS

Guido Buschkens, Krefeld-Traar, and Peter Nobis, Neuss, both of Fed. Rep. of Germany, assignors to Messer Griesheim GmbH, Frankfurt, Fed. Rep. of Germany

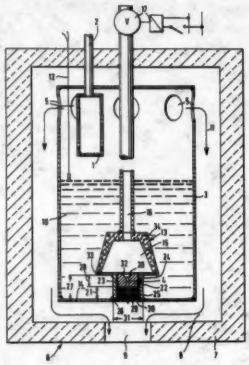
Filed Jan. 8, 1985, Ser. No. 689,790

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1984, 3402292

Int. Cl.[4] F17C *7/02*

U.S. Cl. 62—55 **18 Claims**

1. In a process for metering small amounts of a low boiling liquified gas which flows from an orifice of a cold insulated vessel wherein the process includes feeding the liquified gas into the vessel, collecting the liquified gas in liquid form at the bottom of the vessel, and flowing some of the liquified gas in liquid form through the orifice, the improvement being feeding a sealing gas to the orifice, and selectively closing the orifice



by means of a gas bubble from the sealing gas to prevent flow of the liquid form liquified gas from the orifice.

4,586,344

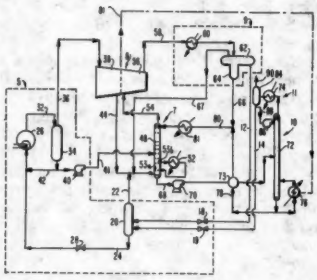
REFRIGERATION PROCESS AND APPARATUS

Irvin H. Lutz, and Jong J. Chen, both of Houston, Tex., assignors to DM International Inc., Tulsa, Okla.

Filed Oct. 23, 1984, Ser. No. 664,024

Int. Cl.[4] F25B *15/00*

U.S. Cl. 62—101 **17 Claims**



1. A refrigeration process comprising the steps of:

evaporating first and second liquid refrigerants recycled from the below recited condensing step,

said evaporating step forming a vapor mixture of the first and second refrigerants,

absorbing the first refrigerant from the vapor mixture in a liquid absorbent to separate the first and second refrigerants and to form a second-refrigerant vapor stream,

desorbing the first refrigerant by heating the liquid absorbent to generate a first-refrigerant vapor stream,

compressing the second-refrigerant vapor stream, and

condensing the first-refrigerant vapor stream and the compressed second-refrigerant vapor stream to form the respective first and second liquid refrigerants recycled to the evaporating step.

4,586,345

SOLAR ENERGY POWERED SYSTEM FOR THE PRODUCTION OF COLD

Svend Friberg, Herlev; Peter Korsgaard, Copenhagen, and Peder Worsoe-Schmidt, Lyngby, all of Denmark, assignors to Kaptan APS, Herlev, Denmark

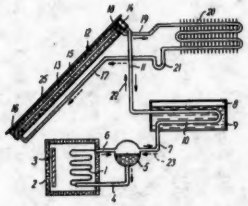
PCT No. PCT/DK84/00040, § 371 Date Jan. 11, 1985, § 102(e) Date Jan. 11, 1985, PCT Pub. No. WO84/04581, PCT Pub. Date Nov. 22, 1984

PCT Filed May 17, 1984, Ser. No. 695,369

Claims priority, application Denmark, May 18, 1983, PCT/DK83/00055

Int. Cl.[4] F25B *27/00*

U.S. Cl. 62—235.1 **4 Claims**



1. A system for the production of cold with an absorption cooling system comprising an evaporator **(1)** positioned in a thermally insulated space **(2)** to which evaporator a coolant is supplied in the liquid state from a condenser **(8)** through a coolant vessel **(5)** and from which evaporator coolant in the vapour state is sucked by an absorber **(12)** which is designed as a solar collector and comprises a humidity absorbing compound for the suction of said coolant at night hours of a comparatively low temperature and delivery of said coolant in the vapour state to the condenser **(8)** at day hours at a comparatively high temperature, said coolant suction and delivery to and from the absorber taking place through one and the same tube connection **(11)** to the evaporator **(1)** and the condenser **(8)**, characterized in that the absorber **(12)** comprises a number of parallel absorber tubes **(13)** which are connected with said tube connection **(11)** through a manifold **(14)**, and each of which comprises said humidity absorbing compound in a direct thermal contact with parallel evaporator tubes **(15)** of a secondary self-circulating cooling circuit positioned coaxially in said absorber tube **(13)**, a solar energy actuated blocking valve device **(21)** being arranged in a coolant supply tube **(17)** between a condenser **(20)** and said evaporator tubes **(15)** in said secondary cooling circuit.

4,586,346

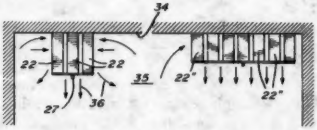
GRAVITY COOLING COIL DEVICE

Guy St-Pierre, 1057 Monteée, Ste. Julie, Quebec, Canada (J0L 2C0)

Filed Mar. 29, 1985, Ser. No. 717,654

Int. Cl.[4] F25D *23/12*

U.S. Cl. 62—259.1 **10 Claims**



1. A gravity cooling coil device comprising at least two columns of fin coils positioned side by side in spaced-apart relationship and defining between them a substantially unobstructed vertical air passage, a pan secured immediately below a respective one of said columns in non-obstruction to said air passage, said pans having a common end thereof connected to a collection trough to collect condensate from said pans, said collection trough having a conduit connected thereto for the removal of condensate therefrom, a bracket member secured at opposed ends of said device to secure same in spaced relationship adjacent a ceiling of a space to be cooled, one of said bracket members being a pre-formed plate having a support channel in a top end thereof and extending a predetermined distance above said at least two columns, an outside wall having vent openings therein for the passage of air between said columns, and a channel bottom end constituting said collection trough.

4,586,347

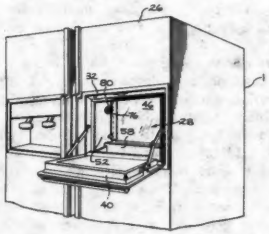
INTERMEDIATE TEMPERATURE STORAGE CHAMBER

William J. McCarty, Louisville, Ky., assignor to General Electric Co., Louisville, Ky.

Filed Sep. 7, 1984, Ser. No. 648,328

Int. Cl.[4] F25D *23/02*

U.S. Cl. 62—265 **8 Claims**



1. In a refrigerator comprising an insulated cabinet containing freezer and fresh food storage compartments separated by an insulated partition and having separate access openings at the front of said cabinet:

a door having an outer door member and an inner door member movable to open and close said access opening to said fresh food storage compartment;

an evaporator chamber in said freezer compartment;

an evaporator in said evaporator chamber;

air supply means including fan means for drawing return air from both of said compartments over said evaporator and discharging refrigerated air into said freezer compartment and into said fresh food compartment;

wall means on said inner door member defining a storage chamber separate from said fresh food storage compartment;

means on said outer door member forming an exterior access opening leading into said storage chamber;

a secondary door on said outer door member movable to open and close said exterior access opening for providing access to said storage chamber; and

means for maintaining a desired temperature in said storage chamber comprising a conduit in said partition and a passageway in said wall means of said storage chamber positioned so as to communicate with said conduit when said door is in its closed position for conveying a controlled amount of refrigerated air from said freezer compartment to said storage chamber to thereby maintain said storage chamber at said desired temperature and to replenish refrigerated air to said storage chamber lost to outside ambient when said secondary door is in its open position.

4,586,348

REFRIGERATOR CABINET

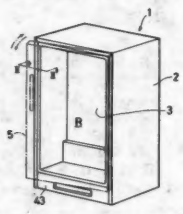
Kiyoshi Nakayama, Ota; Takashi Kato, Kiryu; Tatsuo Sekiguchi, Meiwa; Mamoru Satoh, Oizumi, and Koshiro Hayakawa, Tatebayashi, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Jan. 26, 1984, Ser. No. 573,962

Claims priority, application Japan, Jan. 28, 1983, 58-13525; Jan. 28, 1983, 58-13526; Feb. 16, 1983, 58-25084

Int. Cl.[4] F25B *47/00*

U.S. Cl. 62—277 10 Claims



2. A refrigerator cabinet having an outer box, an inner box, said inner box having a front edge extending around its opening for mounting said inner box in said outer box, and a heat insulating layer filled in a space formed between the boxes, wherein

said outer box comprises a top wall and side walls formed by bending one steel sheet previously coated with paint, a front flange used to bend the front periphery of each wall inwardly at substantially right angles, a turnover flange bent rearwardly to the backside of said front flange, and a rear bent flange leaving a predetermined space toward the backside of the turnover flange and used to form a groove facing and opening inwardly, said groove having left and right corner portions,

wherein a reinforcing member extending vertically and horizontally along said groove is engaged with said left and right corner portions of said groove in such a manner that said reinforcing member contacts the rear bent flange in the groove, and said front edge of the opening of the inner box is inserted in between the reinforcing member and the turnover flange, and

wherein said rear bent flange is cut at the left and right corner portions, the end of said cut being formed so that it tilts inwardly, said reinforcing member having an engaging portion for gripping the cut end of the rear bent flange.

4,586,349

UNITARY AIR CONDITIONER

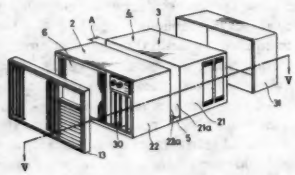
Kenji Ohishi, Shizuoka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 21, 1984, Ser. No. 642,842

Claims priority, application Japan, Nov. 2, 1983, 58-170805[U]; Nov. 2, 1983, 58-170798[U]; Dec. 9, 1983, 58-189919[U]

Int. Cl.[4] F25D *19/00*

U.S. Cl. 62—296 8 Claims



1. A unitary air conditioner having a compressor, a chiller coil, a condenser, an indoor fan and an outdoor provided on a common one-piece base, said air conditioner comprising:

an outdoor cabinet accommodating said compressor, said condenser and said outdoor fan; and

an indoor cabinet accommodating said chiller coil and said indoor fan, said outdoor cabinet having a first noise shielding member facing said indoor cabinet for shielding noise produced in said outdoor cabinet, said indoor cabinet having a second noise shielding member facing said first noise shielding member for preventing propagation of said noise into said indoor cabinet, said first and second noise shielding members being spaced apart from each other to space apart from each other said outdoor and indoor cabinets, which are mounted on said one-piece base, wherein said cabinets define therebetween an open space exposed to outdoor air and having a bottom closed by said base.

4,586,350

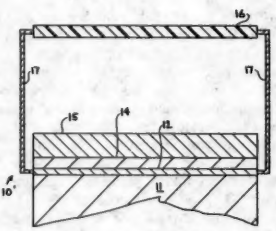
SELECTIVE RADIATIVE COOLING WITH MGO AND/OR LIF LAYERS

Paul H. Berdahl, Oakland, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 14, 1984, Ser. No. 650,593

Int. Cl.[4] F25B *21/02*

U.S. Cl. 62—467 21 Claims



1. A selective radiative cooling material consisting of:

an infrared-reflective substrate, and

at least one layer of material selected from the group consisting of ceramic magnesium oxide, polycrystalline lithium fluoride, and mixtures thereof.

4,586,351

HEAT PUMP WITH MULTIPLE COMPRESSORS

Yoshinobu Igarashi, and Takashi Nakamura, both of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1985, Ser. No. 735,214

Claims priority, application Japan, May 18, 1984, 59-101264

Int. Cl.[4] F25B *43/02*

U.S. Cl. 62—468 8 Claims

1. A heat pump comprising:

two or more compressors connected in parallel;

a pair of heat exchangers;

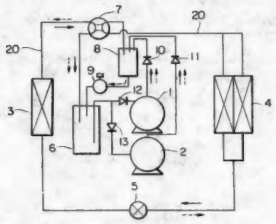
an expansion valve connected between said heat exchangers;

an accumulator having a refrigerant inlet, an oil inlet, and an outlet, said outlet being connected to the intake sides of said compressors;

an oil separator having an inlet, a refrigerant outlet, and an oil outlet with said inlet being connected to the discharge sides of said compressors and said oil outlet being connected to the oil inlet of said accumulator; and

check valves connected between the intake sides of said compressors and the outlet of said accumulator and be-

tween the discharge sides of said compressors and the inlet of said oil separator,



wherein one of said heat exchangers is connected to the intake side of said compressors via said accumulator and the other of said heat exchangers is connected to the discharge side of said compressors via said oil separator.

4,586,352

RECTILINEAR KNITTING MACHINE

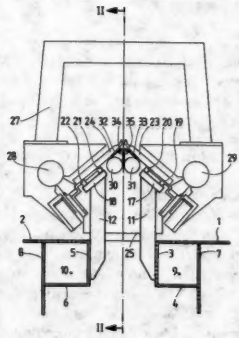
Michel Morard, Vouvry, and Marcello Baseggio, Ollon, both of Switzerland, assignors to Atelier de Construction Steiger S.A., Switzerland

Filed Aug. 22, 1985, Ser. No. 768,430

Claims priority, application European Pat. Off., Aug. 31, 1984, 84201260

Int. Cl.[4] D04B 7/04

U.S. Cl. 66—64 R **6 Claims**



1. Rectilinear knitting machine comprising a frame supporting two needle beds arranged dihedrally above the frame, wherein the frame comprises two shaped beam sections extending horizontally parallel to the needle beds, each considerably below the lower edge of each of the needle beds, and on which are fixed vertical standards distributed along the said shaped sections and equipped at their upper ends with oblique bearing plates on which the needles beds rest, these bearing plates being equipped with a means of adjustment, allowing adjustment of the support points of the needle beds on the said bearing plates or, respectively, the said screws.

4,586,353

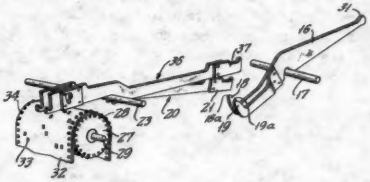
TRIPLE NEEDLE HEIGHT SELECTION MEANS FOR KNITTING MACHINES

Jeno Kahan, 444 Neptune Ave., Brooklyn, N.Y. 11224

Continuation of Ser. No. 465,153, Feb. 9, 1983, abandoned. This application Apr. 12, 1985, Ser. No. 722,512

Int. Cl.[4] D04B 9/38, 15/68

U.S. Cl. 66—230 **6 Claims**



1. In a knitting machine including a slotted drum having a plurality of slots on an arcuate surface thereof, a pattern strip passed about said drum and having perforations therein aligned with the slots in the drum, pivoted selection levers having means for reading the pattern and transmitting indications therefrom, pivoted racket means having means to engage said selection levers and rotate about a pivoted axis, said racket means having a selector cam engaging said selection levers, and needles having means for elevation initiated by said pivoted racket means, the improvement comprising: at least some of said needles being adapted for movement to two operational heights, each of said needles being selectively controlled by either of one of a pair of adjacent levers, said adjacent levers each having an end selectively engaging one of a pair of free end surfaces on a racket means, said last-mentioned surfaces being mutually spaced in a direction along an arcuate path of movement of said racket means, when said racket means is activated; whereby, depending upon which lever is acutated by the pattern strip during a given cycle of operation, the related free end surface on said racket means will elevate a related needle to either of two operative levels.

4,586,354

MOUNTING A DEVICE ON A MEMBER

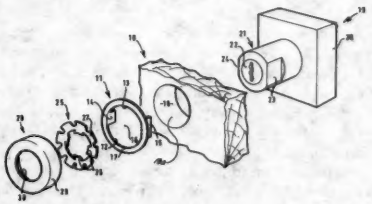
Paul D. Smith, Birmingham, England, assignor to Lowe & Fletcher Ltd., West Midlands, England

Filed Jan. 27, 1984, Ser. No. 574,409

Claims priority, application United Kingdom, Jun. 24, 1983, 8317245

Int. Cl.[4] E05B 9/08

U.S. Cl. 70—451 **3 Claims**



1. An assembly comprising a panel defining a panel opening having a center, a boundary element which defines a non-circular aperture having a center and coinciding with a part of said opening, an annular retaining element and a lock comprising a main body portion and a hollow spigot projecting from the main body portion and a key-receiving member disposed in the spigot wherein the spigot defines an opening at an open end of the spigot remote from the main body portion, the key-receiving member defines a key-slot which is adjacent the open

end of the spigot, the boundary element and the panel are in mutually gripping relation adjacent the panel opening to restrain rotation of the boundary element about the center of the panel opening relative to the panel, the main body portion lies at a first side of the panel, the main body portion overlaps a marginal portion of the panel adjacent the panel opening defined thereby, the spigot extends through said aperture from the main portion and projects from the panel at a second side thereof, the spigot has a non-circular profile which complements the shape of the aperture to restrain rotation of the lock relative to the boundary element about the center of the aperture, the open end of the spigot and the key-slot lie at the second side of the panel and wherein the retaining element lies at the second side of the panel, overlaps and engages the boundary element and is in gripping relation with the spigot to retain the spigot in the aperture.

4,586,355

LOCK CYLINDER COVER WITH KEY ENGAGEMENT RELEASE OF HOLD-OPEN DETENT

David N. Lee, Almont, and David B. Ballantyne, Bloomfield Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 28, 1985, Ser. No. 717,023
Int. Cl.[4] E05B *17/18*
U.S. Cl. 70—455 **2 Claims**

1. A cover arrangement for a vehicle mounted key operated lock cylinder comprising:

an escutcheon mounted on the vehicle and having an opening registering with the lock cylinder;

a cover pivotally mounted on the escutcheon and having associated cover spring means biasing the cover to a closed position concealing the lock cylinder and yielding to permit movement of the cover to the open position to enable insertion of the key;

a spring detent carried by the escutcheon and including a resilient arm having a stop surface and a cam surface registering with the escutcheon opening, said resilient arm acting to urge said stop surface axially outward through the opening and into abutment with the cover to retain the cover in said open position and urge said cam surface to a position poised in the path of the rotating movement of the key so that key rotation to unlock the lock cylinder coacts with the cam surface to move the resilient arm inwardly and thereby withdraw the top surface from abutment with the cover to enable pivotal movement of the cover to the closed position; and

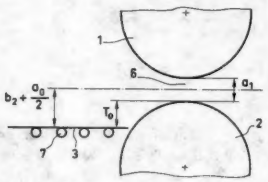
auxiliary blocking means pivotally mounted on the escutcheon and acting between the cover and the resilient arm to retain the resilient arm in the inward position withdrawing the top surface away from the cover, said blocking means having associated operating means for removing the blocking means from blocking engagement with the resilient arm upon closing movement of the cover beyond the point of possible engagement thereof by the stop member of the resilient arm.

4,586,356

PROCESS AND APPARATUS FOR PREVENTING DISSYMMETRY IN ROLLED BEAMS

Pascal Frou, Vernon, and Gilbert Krausener, Metz, both of France, assignors to Institut de Recherches de la Siderurgie Francaise (IRSID), Metz, France

Filed Jul. 1, 1985, Ser. No. 750,356
Claims priority, application France, Jul. 2, 1984, 84 10719
Int. Cl.[4] B21B *37/08*
U.S. Cl. 72—8 **8 Claims**



1. Process of preventing defects in the symmetry of beams during rolling in a universal stand in which the elevation of an inlet table (7) of a rolling mill is adjusted relative to that of operating rolls (1, 2) of said stand, comprising the steps of:

(a) effecting a measurement of the torques applied to an upper (1) and a lower (2) roll of said stand;

(b) calculating from said measurement a value representing the differential between said torques expressed as a preselected criterion of dissymmetry of said beams;

(c) comparing said calculated value to a predetermined reference value (δ) defining a limit differential threshhold tolerance, representing a maximum acceptable value of said dissymmetry criterion; and

(d) if the absolute value of said calculated value is higher than said reference value, altering the elevation of said inlet table (7) relative to that of said operating rolls (1, 2) to reduce said calculated value to below said reference value (δ).

4,586,357

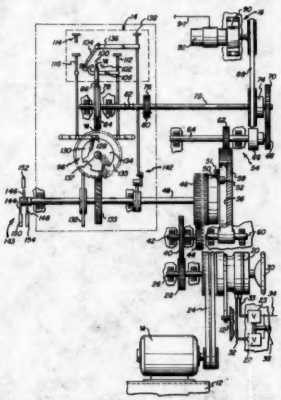
DIGITAL CONTROL SPRING FORMING MACHINE

Werner K. Allweier, Huntington, and David W. Knight, Stratford, both of Conn., assignors to The U. S. Baird Corporation, Stratford, Conn.

Filed Feb. 14, 1985, Ser. No. 701,611
Int. Cl.[4] B21F *35/02*
U.S. Cl. 72—137 **32 Claims**

18. An accessory for advancing wire in an apparatus for progressively forming longitudinally moving wire into springs having body coils and concurrently formed first and second end loops; said apparatus including a fixed wire guide having a rear end and a forward end and a bore therethrough terminating at said forward end in a feeding orifice, feed means for advancing wire through said bore from said rear to said forward end, a plurality of wire deflecting tools, each of said deflecting tools mounted for operation between a retracted position and an advanced position adjacent said forward end of said wire guide, and actuating means for driving said feed means and sequentially operating said plurality of wire deflecting tools between said positions to form a basic spring having a body coil and first and second end loops from the wire advancing from said feed means; comprising means adapted to be connected to said actuating means to selectively interrupt said actuating means for prescribed time intervals after formation of the first end loop, during formation of the body coil, and before and after formation of said second end loop and auxiliary drive means adapted to be connected to said feed means

for selectively driving said feed means during the prescribed time intervals thereby advancing wire through said bore of



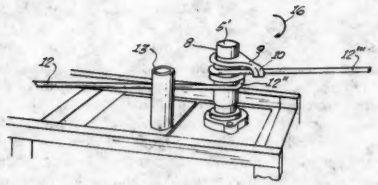
said wire guide and adding selected amounts of wire to the basic spring in selected places.

4,586,358

METHOD AND APPARATUS FOR PRODUCING WOUND COILS

Philip Mangiapane, 1201 Roebuck Ct., West Palm Beach, Fla. 33401

Filed Feb. 10, 1984, Ser. No. 578,968
Int. Cl.[4] B21F *3/04*
U.S. Cl. 72—142 **2 Claims**



1. A machine effective to bend a straight bar into a V-shaped device, said device comprising a pair of V-arms joined together at a vertex, said vertex being a portion of said bar in the form of a coil spring, said machine comprising:

a work surface,

a spool, said spool mounted on said work surface and disposed about a generally vertical axis, said spool being mounted for rotation about said generally vertical axis;

means for rotating said spool,

a spool arm fixedly attached to said spool for rotation therewith and extending outwardly from said spool, said spool arm being positioned on said spool to abutt and twist a first portion of said bar about said spool responsive to said spool rotating about said vertical axis; and

a generally vertically disposed detent post mounted on said work surface, said detent post and said spool located on said work surface and spaced with respect to one another a sufficient distance so that a second portion of said bar abutts said post as said first portion of said bar is rotated by said spool arm, the abutting of said second portion of said bar against said post being effective to prevent said second portion from rotating with said first portion as said first portion is rotated by said spool arm and helically coiled around said spool;

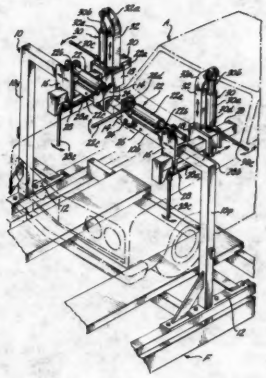
wherein the vertical height of said post is smaller than the vertical height of said spool arm to prevent said first portion of said bar from striking said second portion of said post as said first portion of said bar is coiled around said spool.

4,586,359

ANCHOR ELEMENT POSITIONER APPARATUS FOR AUTOMOBILE BODY REPAIR AND REALIGNMENT

Thomas K. Parks, 3712 N. 39th St., Tacoma, Wash. 98407

Continuation of Ser. No. 546,912, Oct. 31, 1983, abandoned.
This application Jun. 3, 1985, Ser. No. 739,766
Int. Cl.[4] B21D *1/12*
U.S. Cl. 72—302 **17 Claims**



1. Automobile body repair apparatus comprising a rigid arch frame having a generally horizontal cross beam structurally joining upstanding legs adapted to be anchored to a floor frame or equivalent so as to span transversely over opposed body realignment reference elements such as McPherson strut heads of the automobile fixedly seated on said floor frame; a pair of repositioners mounted on said cross beam in positions mutually spaced lengthwise thereof, each such repositioner comprising:

first, second and third reversible-acting linear motion screwjacks;

first, second and third base members;

said first base member being mounted on said cross beam, with means to fix the position thereof lengthwise of said cross beam;

said second base member being slidably mounted on said cross beam to be moved slidably lengthwise thereof;

said first and second base members carrying between them, and being interconnected by, said first screwjack for forcible repositioning of said second base member lengthwise of said cross beam in either direction by operation of said first screwjack;

a generally horizontal beam member carrying said third base member and in turn being carried by said second base member to extend transversely in relation to said cross beam;

said second and third base members carrying between them, and being interconnected by, said second screwjack for forcible repositioning of said third base member lengthwise of said horizontal beam member in either direction by operation of said second screwjack;

said third screwjack being carried by said third base member; and

force applicator means carried by said third base member and including an elongated first cantilever member

mounted to extend downwardly from said third base member and to be forcibly movable upwardly and downwardly by operation of said third screwjack, said force applicator means including coupler means by which to connect the same to the body realignment reference element, thereby to permit forcible repositioning of said latter element in either direction of movement respectively along any of three mutually transverse lines of movement by selective operation of the screwjacks.

4,586,360

METHOD OF AND APPARATUS FOR THE FINE CUTTING (PUNCHING) OF ARTICLES

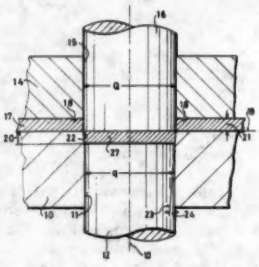
Willi Jürgensmeyer, Wuppertal; Friedrich-Wilhelm Honsberg, and Kurt Halbach, both of Remscheid, all of Fed. Rep. of Germany, assignors to Dako-Werkzeugfabriken David Kotthaus GmbH & Co. KG, Remscheid, Fed. Rep. of Germany

Filed Jul. 6, 1984, Ser. No. 628,183

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1983, 3324680

Int. Cl.[4] B21D *28/14*

U.S. Cl. 72—328 8 Claims



1. A method of fine cutting an article from a flat workpiece, comprising the steps of:

clamping said workpiece between a die plate and a guide plate, said die plate having a hole having the configuration of said article with the wall of the hole defined by at least some flanks tapered away from said guide plates so that the hole decreases in cross-section away from the guide plate, said workpiece being clamped so that a portion of said workpiece lies across said hole and a remainder of said workpiece is clamped between the die plate and guide plate;

supporting said portion of said workpiece lying across said hole with an ejector; and

punching said portion of said workpiece from the remainder of said workpiece into said hole with a punch having a cross section complementary to the cross section of said hole at a side thereof turned toward said guide plate by displacing said punch in said guide plate toward said die plate while continuing to support said portion with said ejector, thereby separating said portion from the remainder of the workpiece and simultaneously with the separation of said portion, swaging it to have tapered flanks in said hole and to form said article.

4,586,361

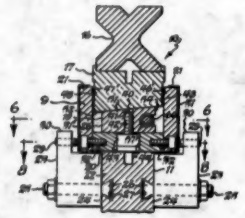
PRESS BRAKE DEFLECTION COMPENSATION STRUCTURE

Andrei Reinhorn, Williamsville, and George H. Trautman, Jr., Buffalo, both of N.Y., assignors to Niagara Machine & Tool Works, Buffalo, N.Y.

Filed Aug. 24, 1984, Ser. No. 643,789

Int. Cl.[4] B21D *31/00*

U.S. Cl. 72—389 17 Claims



1. Deflection compensation structure to compensate for deflection of the bed and ram of a press brake comprising a housing, an upper elongated wedge member in said housing having a lower inclined surface and end portions and a central portion therebetween, a lower elongated wedge member in said housing having a longitudinal axis and a wide edge and a narrow edge and end portions and a central portion between said end portions, an upper inclined surface on said lower wedge member in engagement with said lower inclined surface of said upper wedge member, securing means for securing said end portions of said lower elongated wedge member against substantial movement relative to said housing in a direction transverse to said longitudinal axis, a plurality of transverse slots spaced longitudinally of said longitudinal axis between said end portions of said lower wedge member and extending inwardly into said lower wedge member from said wide edge, and force-applying means for applying opposed facing forces to said lower wedge member at said end portions proximate said wide edge to thereby cause said narrow edge of said lower wedge member to bow into a convex configuration and thus cause said upper inclined surface at said central portion of said lower wedge member to move in a direction toward said narrow edge a greater distance than said end portions of said lower wedge member to thereby effectively raise said upper wedge member at the central portion thereof to compensate for deflection of said bed and ram adjacent said central portions of said wedge members.

4,586,362

BLIND RIVETING MACHINE

Sidney Dean, Sutton Coldfield, and John G. Butcher, Birmingham, both of England, assignors to USM Corporation, Farmington, Conn.

Filed Jun. 3, 1985, Ser. No. 740,422

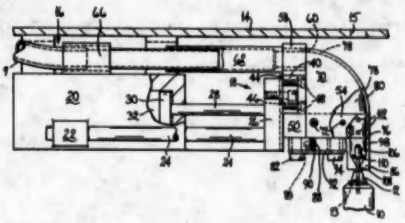
Claims priority, application United Kingdom, Jun. 5, 1984, 8414349

Int. Cl.[4] B21D *31/00*

U.S. Cl. 72—391 5 Claims

1. A blind-riveting machine comprising a device for presenting a blind-riveting assembly to a nosepiece of a rivet-setting head of the machine, the presenting device comprising holding means to rest and releasably hold assemblies fed thereto one at a time mandrel stem foremost in the operation of the machine, means for bringing a bore in said nosepiece of the rivet-setting head and said holding means of the presenting device into alignment with one another in order that the mandrel stem of an assembly fed to the holding means can pass into the bore of the nosepiece, and means for causing relative displacement to take place between the rivet-setting head and the presenting device so that the assembly released by the holding means is

exposed for insertion into a workpiece, the presenting device providing a chamber bounded on two opposite sides by flat walls and spanned by a curved wall leading from an inlet at one



end of the chamber to said holding means at an outlet at the other, whereby assemblies change their direction of travel as they slide along the curved wall from the inlet to the outlet.

4,586,363

BLIND RIVETING MACHINE

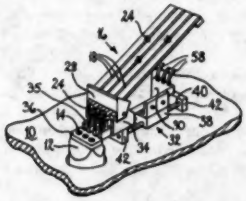
Sidney Dean, Sutton Coldfield, and John G. Butcher, Great Barr, both of England, assignors to USM Corporation, Farmington, Conn.

Filed Jun. 3, 1985, Ser. No. 740,540

Claims priority, application United Kingdom, Jun. 5, 1984, 8414343

Int. Cl.⁴ B21D *31/00*

U.S. Cl. 72—391 **6 Claims**



1. A blind-riveting machine comprising a transfer device for transferring a blind-riveting assembly from a receiving position to a nosepiece of a rivet-setting head of the machine, said device comprising a pick-up member reciprocable between a pick-up position and a delivery locality in alignment with said nosepiece, and the machine comprising means for presenting blind-riveting assemblies one at a time to said pick-up position in an upright position with the rivet uppermost, said pick-up member having a face with a vertical groove in it for reception of the mandrel stem and means for temporarily holding the mandrel stem in said groove, said member, in the operation of the machine, advancing to said delivery position at which the mandrel stem is aligned with an upwardly facing nosepiece, and the machine comprising means for releasing the mandrel stem from said member so that it falls into the nosepiece before said member retracts to its assembly receiving position.

4,586,364

QUICK-CHANGE TRANSFER HEAD

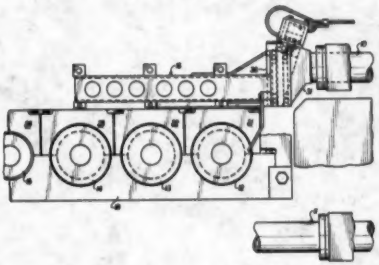
James R. Berger, Tiffin, Ohio, assignor to The National Machinery Company, Tiffin, Ohio

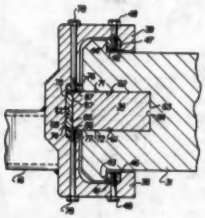
Filed Jul. 21, 1982, Ser. No. 400,277

Int. Cl.⁴ B21J *13/08*

U.S. Cl. 72—405 **7 Claims**

1. A demountable transfer for forging machines and the like comprising a powered movable transfer support, an elongated transfer assembly, and mounting means releasably securing said assembly on said support, said mounting means including substantially planar surfaces carried by said assembly and support which are engageable to locate said assembly in a predetermined fixed position relative to said support, and a single power-operated locking wedge operable to releasably secure said surfaces in engagement, said surfaces being located for removal of said assembly when said locking wedge is released by movement of said assembly in a first direction and replacement of said assembly by movement thereof in the opposite direction, said surfaces including support surfaces and mating assembly surfaces, said support surfaces extending





along three planes which are substantially mutually perpendicular to each other, said locking wedge providing opposed substantially parallel surfaces which cooperate with mating surfaces on said transfer assembly to provide at least two pair of engaging surfaces to lock said transfer assembly against lateral movement relative to said transfer support from said predetermined fixed position, said mounting means including locating means operable to guide said assembly to said predetermined fixed position as said assembly is moved in said opposite direction.

4,586,365

APPARATUS FOR AUTOMATICALLY TRANSPORTING WORK-PIECES IN A DROP FORGING PRESS

Wigand Henkelmann, Leverkusen, Fed. Rep. of Germany, assignor to Emuco Aktiengesellschaft für Maschinenbau, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 400,184, Jul. 20, 1982, abandoned. This application Nov. 6, 1984, Ser. No. 669,047

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1981, 3129482

Int. Cl.⁴ B21J *13/08*; B21D *43/05*

U.S. Cl. 72—405 **6 Claims**

1. In an assembly for carrying out automatic workpiece transport in a die forging press wherein the workpieces are transported from one tool to the next tool by transporting apparatus including transport lifting beams which carry out a longitudinal movement, a lifting and lowering movement and a transverse movement toward and away from each other with the transport lifting beams having workpiece engaging mem-

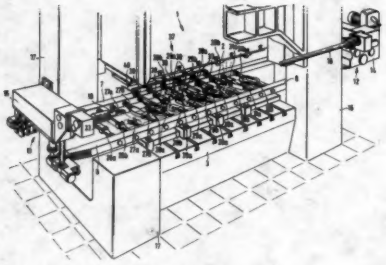
bers which engage the workpieces between the lifting beams, the combination comprising:

(a) means defining a plurality of work stations along the length of the press,

(b) two tools located at each work station with each of said tools providing a working point and serving to effect the same working step at each said work station,

(c) the transport lifting beams including two respective pairs of workpiece engaging members for each of the work stations with each pair of workpiece engaging members serving adjacent working points,

(d) said transport lifting beams having a transport path corresponding to the distance between different work stations,



(e) means for blasting and spraying located above the transfer lifting beams and including supply tubes having spraying heads and a support which carries each supply tube with a spraying head to clean each tool of a work station, the total number of spraying heads on said support thereby corresponding to at least the number of work stations each having two tools in the die forging press,

(f) the support carrying the spraying heads and supply tubes being reciprocatable in a direction transverse to the transport path of the transport lifting beams,

(g) said transport lifting beams being effective to deliver a workpiece to only one of the tools at a single working point at each work station while leaving the other tool at each working station free of the workpiece,

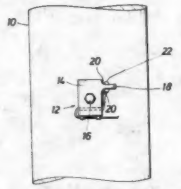
(h) said spraying head constituting means to clean each said other tool that is free of a workpiece at each work station.

4,586,366

METHOD AND APPARATUS FOR MEASURING DRIVING RESISTANCE AND VELOCITY OF PILES DURING DRIVING

Lionel J. Milberger, 8911 Rocky La., Houston, Tex. 77040

Filed Mar. 14, 1984, Ser. No. 589,309
Int. Cl.[4] G01N *3/34*
U.S. Cl. 73—12 **23 Claims**



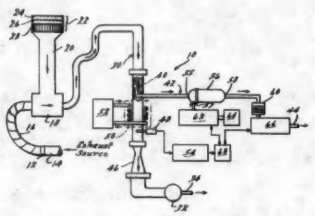
10. Apparatus for measuring the acceleration imparted to a pile by a pile driving hammer, comprising: a strain gage accelerometer responsive to longitudinal movement of the pile adapted for mounting on the pile and having a body constructed of a material having high internal damping characteristics.

4,586,367

PROPORTIONAL EXHAUST SAMPLER AND CONTROL MEANS

Gary W. Lewis, Fountain Valley, Calif., assignor to Horiba Instruments Incorporated, Irvine, Calif.

Filed Mar. 19, 1984, Ser. No. 591,203
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—23 **17 Claims**



1. An apparatus for sampling the emission content of a source for use in a system having sampling means for providing an emission containing sample comprising:

means for defining a flow confining path which includes said sampling means;

means coupled with said flow confining path for establishing a flow in said flow confining path;

flow controlling means disposed in said flow confining path for providing a controlled pressure drop, thereby defining a first pressure side and a relatively lower second pressure side;

mass flow measuring means responsive to the flow on said second pressure side for controlling said flow controlling means;

first flow controlling means disposed in said first leg for providing a controlled pressure drop, thereby defining a relatively high pressure side and a relatively low pressure side;

first mass flow measuring means responsive to the flow on said low pressure side of said first leg for controlling said flow controlling means;

second flow controlling means disposed in said second leg for providing a controlled pressure drop, thereby defining a relatively high pressure side and a relatively low pressure side; and

second mass flow measuring means responsive to the flow on said low pressure side of said second leg for controlling said flow controlling means.

4,586,368

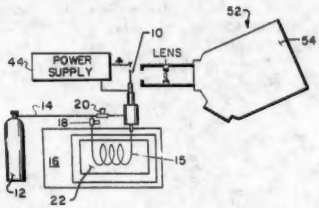
ATMOSPHERIC PRESSURE HELIUM AFTERGLOW DISCHARGE DETECTOR FOR GAS CHROMATOGRAPHY

Gary Rice, Gloucester, Va.; Arthur P. D'Silva, and Velmer A. Fassel, both of Ames, Iowa, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 5, 1985, Ser. No. 720,328
Int. Cl.[4] G01N *30/74*
U.S. Cl. 73—23.1 **7 Claims**

1. An electrodeless discharge apparatus for use in producing atmospheric pressure afterglows from helium as an element specific, multielemental gas chromatography detector comprising: a discharge tube having an upper open end, and a lower end means for supplying helium at atmospheric pressure to the discharge tube, a first electrode concentrically encircling at least a portion of said tube near the upper end and

coupled to a suitable high frequency power source for applying power at a predetermined frequency to excite the helium, a second grounded electrode positioned coaxially with the



upper open end of the tube, but spaced therefrom, for creating an afterglow region in the tube between the two electrodes and, sample discharge means for depositing a sample from the gas chromatograph into the afterglow region.

4,586,369

METHOD AND APPARATUS FOR DETERMINING CYLINDERS OPERATING WITH IRREGULAR COMBUSTION OF AN INTERNAL COMBUSTION ENGINE

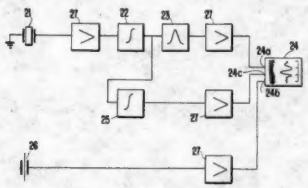
Günther Vogler, Kernen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 26, 1984, Ser. No. 665,399

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1983, 3338959

Int. Cl.[4] G01M *15/00*

U.S. Cl. 73—117.3 **10 Claims**



1. A method for determining cylinders operating with irregular combustion of an elastically supported multi-cylinder engine, comprising the steps of plotting as a function of time the amplitude of a velocity signal filtered out of the velocity signal of the engine vibrations taking place about the axis of rotation of the internal combustion engine which occur during the combustion operations in the cylinders and alternate with the repetition frequency of the internal combustion engine, a synchronizing pulse coordinated to a predetermined angular position of each operating cycle of the internal combustion engine and the amplitude of the vibration distance signal coordinated to the vibration distance of the engine vibrations which take place about the axis of rotation of the internal combustion engine, and determining from the position of the synchronizing pulse the cylinder or cylinders having an irregular combustion whose coordinated amplitude or amplitudes of the vibration velocity signal is clearly smaller than the amplitudes coordinated to the other cylinders and some of the amplitudes of the vibration distance signal which follow in time are clearly larger than the amplitudes occurring during normal combustion.

4,586,370

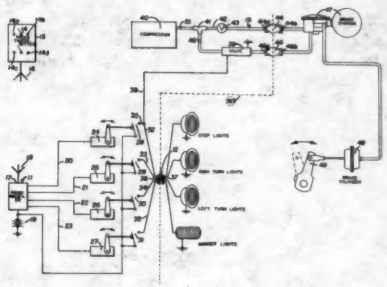
TESTER FOR ELECTRIC AND PNEUMATIC SYSTEMS OF VEHICULAR TRAILERS

Kenneth R. Massender, N. 6502 Pittsburg, Spokane, Wash. 99208

Filed Nov. 25, 1983, Ser. No. 555,299

Int. Cl.[4] G01L *5/28*

U.S. Cl. 73—121 **3 Claims**



1. A self powered portable apparatus to test electric and electro-pneumatic systems of a vehicular trailer comprising, in combination:

a portable, self powered radio transmitter having at least four normally open switches each of which may be closed to cause the transmitter to send distinguishable signals to a radio receiver;

a radio receiver to receive the aforesaid signals and responsive thereto transmit an electric current in at least four electrical circuits, the transmittal of current in any one circuit being responsive to closure of a particular transmitter switch;

each of said electrical circuits having an electro-mechanical device to operate, upon receipt of electric current, to close a normally open switch, each of said switches being in parallel with a source of electrical energy and in series with one of the electrical circuits of a vehicular trailer to pass electric current to a trailer circuit upon closure of the aforesaid switch in said circuit.

4,586,371

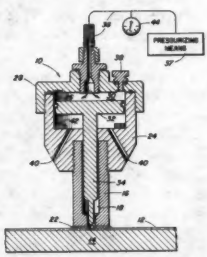
APPARATUS FOR ADHESION TESTING OF COATINGS

Randall G. Ivie, and William H. Thomason, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Nov. 7, 1984, Ser. No. 669,128

Int. Cl.[4] G01B *21/00;* **G01N** *3/08*

U.S. Cl. 73—150 A **9 Claims**



1. An apparatus for measuring and testing adhesive bonding strength of a coating to a substrate in a tensile mode comprising a dolly having an axially centered opening passing there-

through, said dolly having a bonding surface conforming to a surface of said coating; bonding means for adhering said dolly bonding surface to said coating surface, said bonding means having an adhesive bond strength in excess of a bonding strength of an adhesive bond between said coating and said substrate; ram means passing through said axially centered opening in said dolly, said ram means adapted for engagement against a centered portion of said coating surface bonded to said dolly; piston means attached to one of said ram and said dolly and cylinder means attached to the other of said ram and said dolly for forcing said ram into pressure abutment against said coating surface and for placing said dolly, said bonding means and said coating in tension, and means for determining said tension.

4,586,372

METHOD AND ARRANGEMENT FOR THE CONTINUOUS CONTACTLESS MEASUREMENT OF THE SHRINKAGE OF TEXTILES

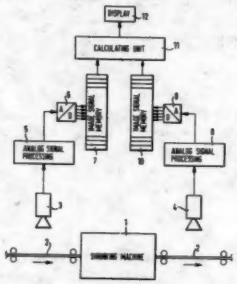
Robert Massen, Kämpfenstrasse 39, 7760 Radolfzell 18, Fed. Rep. of Germany

Filed Apr. 30, 1985, Ser. No. 729,112

Claims priority, application Fed. Rep. of Germany, May 8, 1984, 3416883

Int. Cl.[4] G01N *33/34*

U.S. Cl. 73—159 **30 Claims**



1. Method for the continuous contactless measurement of the shrinkage of textiles during production thereof, said method comprising the steps of:

picking up an image of a portion of the textile surface both before and after the shrinkage with the aid of an image/-signal transducer;

converting said image into analog electrical image signals;

digitizing said analog electrical image signals to give digital image signals;

storing said digital image signals image-pointwise;

deriving a first period of the textile structure in at least one evaluation direction before the shrinkage from the stored digital image signals;

deriving a second period of the textile structure in the same one or each evaluation direction after the shrinkage from the stored digital image signals; and

calculating the change of length of the textile material caused by the shrinkage in the or each evaluation direction from the ratio of said first and second periods determined in this direction.

4,586,373

DEVICE FOR MEASURING THE SINGLE FLANK ERROR OF A PAIR OF INTERMESHING TOOTHED WHEELS

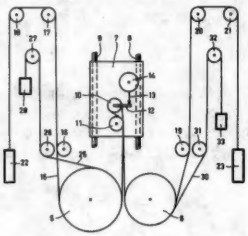
Johannes C. A. Muller, and Arnoldus R. C. Schout, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 7, 1984, Ser. No. 682,607

Claims priority, application Netherlands, May 11, 1983, 8301682

Int. Cl.[4] G01M *13/02*

U.S. Cl. 73—162 **6 Claims**



1. A device for measuring the single flank error of a pair of intermeshing toothed wheels, comprising

two shafts, on each of which a respective one of the toothed wheels can be secured,

a respective disk secured on each shaft, having a diameter which corresponds to the diameter of the pitch circle of the toothed wheel secured on the same shaft,

a single length of wire or tape having two portions, each portion wound around one of said disks,

means for unwinding a length of each said portion of wire or tape from its respective disk upon application of a tensile force causing rotational movement of the disks and toothed wheels, whereby any flank error in the toothed wheels will cause a displacement difference between said lengths of each said portion,

a point of each said portion being fixedly connected to a point on the circumference of the respective disk,

said unwinding means comprising a measuring disk mounted on a displaceable carriage, said wire or tape being guided in a loop around said measuring disk and between the respective disks on the two shafts, whereby said rotational movement of the disks and toothed wheels is caused by said carriage being displaced, and any displacement difference between said lengths of each said portion causes rotational movement of said measuring disk, and

said device further comprising means arranged on said carriage for measuring said rotational movement of said measuring disk for providing an indication of flank error of the toothed wheels.

4,586,374

PROCEDURE AND MEANS FOR WIRELESS MEASUREMENT OF THE SPEED OF SMALL CRAFT SUCH AS A SURFBOARD OR A BOAT

Seppo SäynjäKangas, Takatie, 90440 Kempele, Finland

Filed Feb. 6, 1985, Ser. No. 698,614

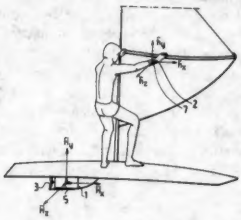
Claims priority, application Finland, Feb. 6, 1984, 840464

Int. Cl.[4] G01C *21/10*

U.S. Cl. 73—187 **6 Claims**

1. A procedure for wireless measurement of the speed of a small craft, such as a surfboard or a boat, wherein the speed of the craft is measured with the aid of a speed pick-up by means of a separate measuring and transmitting device attached to the craft's bottom and in wireless fashion transmitted to a separate receiver device, wherein the speed of the craft is detected from the voltage induced in the windings of an electric generator

connected to a rotating speed measuring element and is telemetrically transmitted to the receiver device by using a mag-



netic field and that the electric energy required for the transmitter device is formed of the voltage induced by said electric generator.

4,586,375

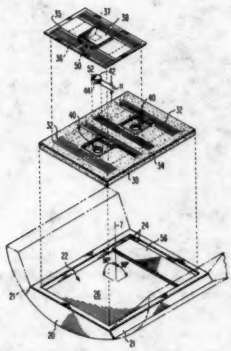
REUSABLE CENTRIFUGE FIXTURE AND METHODS OF MAKING AND USING SAME

Armando G. Manfredi, Readington Township, Hunterdon County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 29, 1984, Ser. No. 645,217

Int. Cl.[4] G01N *3/08, 33/00, 19/00*

U.S. Cl. 73—432 R **6 Claims**



1. In a method of centrifuging a part in a centrifuge machine wherein a portion of said part is to be placed in tension in a predetermined direction relative to a side of said part, said direction being coincident with a radial of said centrifuge machine, the steps of:

(a) providing a reusable centrifuge fixture for holding said part wherein said fixture is arranged on said radial and includes a region of molded material having a surface with a depression therein corresponding to the contours of said side of said part, the surface of said depression being resilient;

(b) placing said part into said fixture wherein said side mates with said depression; and

(c) rotating said fixture and part about the origin of said radial.

4,586,376

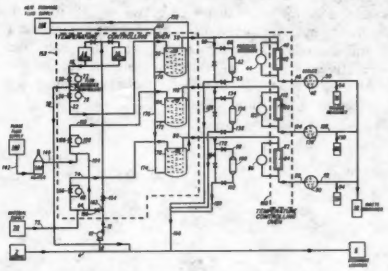
DETERMINING THE EFFECT OF FLUID FLOW THROUGH PERMEABLE MEDIA

H. Donald Outmans, Laguna Beach, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Sep. 25, 1984, Ser. No. 654,761

Int. Cl.[4] G01N *15/08, 33/24*

U.S. Cl. 73—432 R **52 Claims**



1. An apparatus for predicting the effect of the flow of a fluid through a permeable particulate medium comprising:

(a) sampling means for withdrawing from a body of the fluid a sample stream;

(b) an aging conduit in fluid-tight communication to the sampling means for passing the sample stream therethrough in turbulent flow without substantial backmixing, said conduit having a length and shape adapted to retain the sample stream therein for a time substantially equal to the time required for the body of the fluid to traverse the distance between the sampling means and the permeable particulate medium;

(c) a permeable particulate test medium in fluid-tight communication with the aging conduit;

(d) means for flowing an aged sample stream recovered from the aging conduit through the permeable particulate test medium; and

(e) means for measuring the effect of flow of the aged sample stream through the permeable particulate test medium.

4,586,377

DUAL ACCELEROMETER, METHOD FOR ITS FABRICATION AND APPLICATION THEREOF

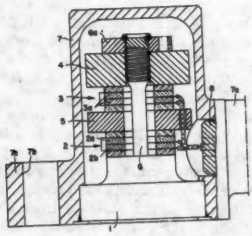
Felix Schmid, Villars-sur-Glâne, Switzerland, assignor to Vibro-Meter SA, Fribourg, Switzerland

Filed Feb. 21, 1984, Ser. No. 581,906

Claims priority, application European Pat. Off., Feb. 21, 1983, 83810073

Int. Cl.[4] G01P *15/09*

U.S. Cl. 73—517 R **21 Claims**



1. A dual accelerometer having first and second output channels and comprising:

a mounting base;
a first electro-mechanical transducer having a first sensitivity;
a second electro-mechanical transducer having a second sensitivity;
a first seismic mass acting on both of said first and second electro-mechanical transducers, said first and second electro-mechanical transducers being disposed between the mounting base and said first seismic mass; and
a second seismic mass disposed between said first and second electro-mechanical transducers, said first and second seismic masses and said first and second sensitivities being relatively selected so that for a common acceleration each of said first and second output channels carry signals of essentially the same value.

4,586,378

UNKNOWN SOUND EVALUATING METHOD AND APPARATUS

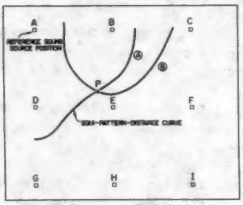
Shigeru Izumi, Hitachi; Yoshihiro Michiguchi, and Makoto Senoh, both of Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 5, 1984, Ser. No. 658,167

Claims priority, application Japan, Oct. 7, 1983, 58-187028; Jan. 11, 1984, 59-1987

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—572 **9 Claims**



1. A method of evaluating position of an unknown sound source in a structure, comprising steps of:
(a) producing sequentially reference sounds from a plurality of known reference sound source positions in the structure, the region of said structure for which the unknown sound source position is to be evaluated being composed of a number of mesh points which is greater than the number of said reference sound sources;
(b) detecting said reference sounds produced sequentially by means of at least three sound detectors which are installed, respectively, at predetermined positions of said structure;
(c) preparing reference sound data on the basis of the detected reference sounds information, data of the positions of said reference sound sources and data of the positions of said sound detectors, said reference sound data being stored in storage means;
(d) preparing data of equi-pattern-distance curves each of which interconnects those mesh points which are in an equal pattern distance between a supposed unknown sound source and each of said reference sound sources on the basis of said reference sound data;
(e) correcting each of the equi-pattern-distance curves data on the basis of the pattern distances actually measured between the reference sound source associated with said equi-pattern-distance curve and at least one of the other reference sound sources, the corrected equi-pattern-distance curves data being stored in the storage means;
(f) detecting an unknown sound generated by an unknown sound source in said structure by means of the plurality of said sound detectors;
(g) preparing unknown sound data on the basis of the detected unknown sound, and calculating pattern distances between desired ones of said reference sound sources and said unknown sound source for at least three reference sound source positions on the basis of said unknown sound data and said reference sound data stored in said storage means; and
(h) reading out those equi-pattern-distance curves which coincide with said calculated pattern distances and determining a particular mesh point derived from said equi-pattern-distance curves to be the position of the unknown sound source.

4,586,379

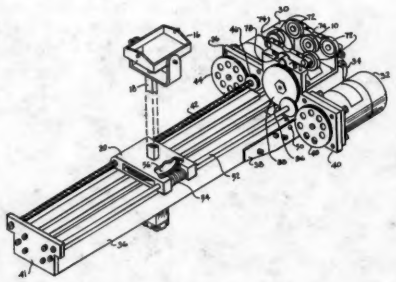
ULTRASONIC PIPE INSPECTION SYSTEM

Frederick R. Burkhardt, Jr., Chester, Va., assignor to Virginia Corporation of Richmond, Chester, Va.

Filed Sep. 28, 1984, Ser. No. 655,903

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—622 **12 Claims**



1. Apparatus for moving an ultrasonic transducer around a welded joint between two end-to-end portions of a pipe, comprising:
(i) means having a surface slidable against a pipe wall and adapted to mount an ultrasonic transducer capable of transmitting and sensing at an angle through said surface for weld inspection;
(ii) supporting means, and means connecting said supporting means to said mounting means so that said surface is tiltable to follow the contour of a pipe while pressure is transmitted through the connecting means to said surface;
(iii) the connecting means being rotatable to cause rotation of said surface about itself while against a pipe and thereby change the direction of transmission to a transducer in the mounting means, such rotation being substantially independent of any sidewise movement of the surface;
(iv) means to cause the connecting means to press said surface against a pipe;
(v) means to slide said surface around and between both sides of a weld around a pipe, comprising an arcuate track mountable around a pipe, a carriage movable around the track, and an arm extending from the carriage generally parallel to the central axis through the track and secured to the carriage against endwise movement relative to the carriage, said supporting means being movable along the arm and carrying

with it said connecting means and mounting means for movement toward and from the carriage when the supporting means moves along the arm, and for swinging movement around a pipe on which the track is mounted when the carriage moves around the track; and

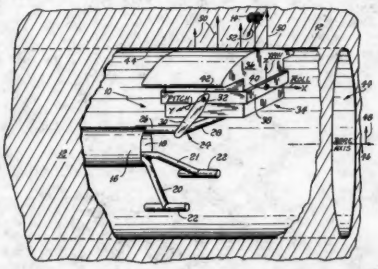
(vi) drive transmission means connected to the connection means to rotate the slidable surface, comprising a component mounted on and carried by the carriage, another component mounted on and carried by said supporting means for movement toward and from the carriage and the first-mentioned component, and means extending between and connecting said components for transmission of rotary drive from the first mentioned component to the other component while permitting said movement toward and from each other.

4,586,380

ULTRASONIC TRANSDUCER ASSEMBLY

Robert W. Patterson, Cobleskill, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 17, 1985, Ser. No. 692,608
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—623 **17 Claims**



1. Apparatus for positioning an object having a first surface with a predetermined radius of curvature in alignment with a second surface having a second predetermined radius of curvature, comprising:

first means for pivoting said object about a roll axis;

second means for pivoting said object about a pitch axis;

said second means including means for moving the first surface said object into contact with said second surface; and

said first means including means for automatically pivoting said object into a predetermined rotation about said roll axis, such that a predetermined portion of said second surface contacts said first surface of said object.

11. A transducer assembly in accordance with claim 10 further comprising:

a second swivel bar disposed at a second end of said cradle;

said second swivel bar being pivotably mounted to said cradle, and including means for permitting pivoting movement thereof about said roll axis;

said second swivel bar including a single pivot point disposed at a second height relative to said plane, said second height being greater than said first height;

a third contact device affixed to said single pivot point;

a second tension arm pivotably mounted to said second swivel bar, and including means for permitting pivotal movement about an axis parallel to said pitch axis; and

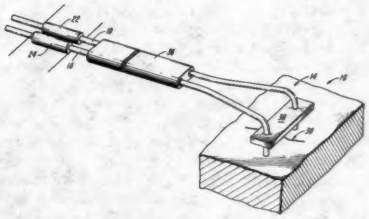
means for pivotably affixing said transducer to said second tension arm.

4,586,381

NONDESTRUCTIVE ULTRASONIC TRANSDUCER

Jacques R. Chamuel, Framingham, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Jul. 29, 1983, Ser. No. 518,528
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—643 **21 Claims**



1. A probe for nondestructive inspection of a workpiece from an operator station, said workpiece having an accessible surface, said probe comprising:

a first elongated elastic wave waveguide having an end in elastic wave transmitting contact with said workpiece;

means operative to excite elastic waves in said first elongated waveguide at a location of said first waveguide remote from said end in elastic wave transmitting contact with said workpiece for transmission through said waveguide to said workpiece;

a second elongated elastic wave waveguide having an end in elastic wave transmitting contact with said workpiece;

a sheath;

said first and second waveguides being slidably disposed within said sheath and extending therethrough, said sheath being fabricated of a material to provide an acoustic mismatch between the respective waveguides and the sheath, said sheath providing mechanical support for said waveguide;

elastic wave detection means disposed on said second waveguide at a location of said second waveguide remote from said end in elastic wave transmitting contact with said workpiece and operative to produce an output signal representative of elastic waves in said second waveguide, said signal corresponding to elastic waves transmitted through said workpiece from said first waveguide end to said second waveguide end;

the presence and location of a flaw with respect to said waveguide ends in elastic wave transmitting contact with said workpiece and with respect to said workpiece surface being detectable upon analysis of said output signal.

4,586,382

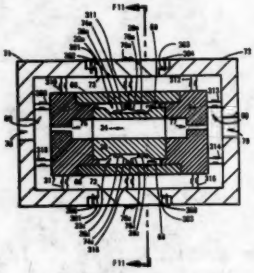
SURFACE ACOUSTIC WAVE SENSORS

Bikash K. Sinha, West Redding, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 427,240, Sep. 29, 1982. This application Aug. 1, 1984, Ser. No. 636,874

Int. Cl.[4] G01L *11/00*

U.S. Cl. 73—703 43 Claims



1. A surface acoustic wave signal frequency apparatus comprising a crystalline diaphragm section having:

a cylindrical or spherical outer surface and a cylindrical or spherical inner surface, wherein:

one of said outer and inner surfaces is adapted for subjection to an applied pressure; and

the other of said outer and inner surfaces includes a first area thereof having a selected orientation and being adapted for the fabrication of a surface acoustic wave device, and a second area thereof having an orientation substantially identical to the orientation of said first area and being adapted for the fabrication of a surface acoustic wave device;

a first portion of said diaphragm section between said surface adapted for subjection to an applied pressure and said first area having a first predetermined thickness; and

a second portion of said diaphragm section between said surface adapted for subjection to an applied pressure and said second area having a second predetermined thickness different than said first predetermined thickness.

4,586,383

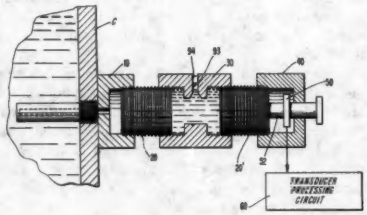
ELECTRONIC PRESSURE GAUGE AND FLOW METER

George W. Blomquist, 905 S. Holly St., Hammond, La. 70401

Filed Sep. 13, 1982, Ser. No. 417,454

Int. Cl.[4] G01L *7/08, 9/00*

U.S. Cl. 73—706 40 Claims



1. Apparatus for measuring a parameter of a fluid comprising:

an adapter for providing an output signal having a pressure related to a parameter being measured;

a transducer for providing an electrical output signal having a value indicative of a pressure applied thereto;

plural means for modifying the adapter output signal to a value directly proportional to said output signal, each of the plural means having a different proportionality between the adapter output signal and the modified signal, and

means connecting at least one of said plural means between said adapter and said transducer, including means for applying to said transducer a modified signal that is within the operating range of said transducer, said connecting means enabling said one of said plural means to be removed from between said adapter and said transducer and a different one of said plural means to be substituted therefor.

4,586,384

PRESSURE OR PRESSURE DIFFERENCE MEASURING INSTRUMENT

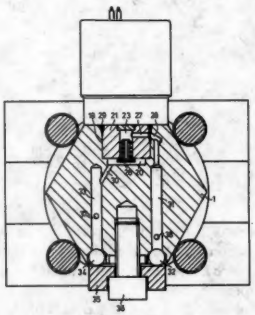
Horst Pehlgrim, and Moriz von Rauch, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Feb. 25, 1985, Ser. No. 705,132

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 8407659

Int. Cl.[4] G01L *7/08*

U.S. Cl. 73—716 2 Claims



1. A pressure or pressure difference measuring instrument comprising a central portion having end faces, a separating diaphragm being disposed on each end face, the central portion having a recess in an area between the diaphragms, a pressure sensing device being disposed in the recess, a carrier member for supporting the pressure-sensing device being inserted into the recess, the carrier member having a cross hole which terminates in a pressure-transmitting canal in the central portion, the outer surface of the carrier member being joined to the central portion by a welded connection so that a seal is produced in the area of the point of transition from the cross hole to the pressure transmitting canal by the welded connection.

4,586,385

Patent Not Issued For This Number

4,586,386

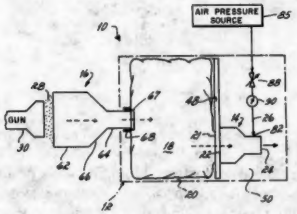
METHOD AND APPARATUS FOR DETERMINING POWDER FLOW RATE AND TRANSFER EFFICIENCY OF POWDER SPRAY SYSTEM

Thomas E. Hollstein, Amherst; Robert A. Herrig, Elmore; Terrence M. Fulkerson, Parma, and John Sharpless, Oberlin, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Oct. 29, 1984, Ser. No. 665,934

Int. Cl.[4] G01F *1/74*; G01N *5/00*

U.S. Cl. 73—861.04 **3 Claims**



1. A method of determining the flow rate of an electrostatic powder spray gun by means of a pneumatic powder collector having a powder collection bag as a portion thereof, which method comprises

positioning the inlet opening of the pneumatic powder collector adjacent but spaced from the discharge opening of a powder spray gun so that said powder collector does not place a back pressure upon air entrained powder discharged from said gun,

creating a vacuum within said collector bag by supplying high pressure air through a pressure regulator to a vacuum chamber of said pneumatic powder collector,

adjusting the pressure of said pressure regulator so as to create a pressure in said vacuum chamber operative to draw all of the air entrained powder emitting from said powder spray gun into said collection bag of said pneumatic powder collector without increasing the flow of powder from the gun, and

collecting within said collector bag all of the powder sprayed from said gun during a predetermined timed interval so as to enable the powder flow rate of said gun to be determined by dividing the weight of powder collected in said bag during said time interval by the time of such collection.

4,586,387

FLIGHT TEST AID

Garth A. Morgan, Willaston; William I. Menadue, Joslin, and Robert E. Clarke, Hectorville, all of Australia, assignors to The Commonwealth of Australia, Australia

PCT No. PCT/AU83/00078, § 371 Date Feb. 15, 1984, § 102(e) Date Feb. 15, 1984, PCT Pub. No. WO84/00064, PCT Pub. Date Jan. 5, 1984

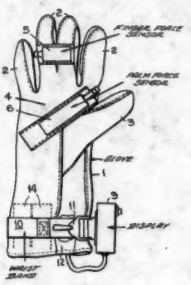
PCT Filed Jun. 8, 1983, Ser. No. 589,091

Claims priority, application Australia, Jun. 16, 1982, PF4452

Int. Cl.[4] G01L *5/22*

U.S. Cl. 73—862.05 **11 Claims**

1. A flight test aid comprising means to measure force that is applied by a pilot to the control column of an aircraft to adjust the ailerons and elevators while manoeuvering the aircraft in flight, and having a finger force sensor, a palm force sensor, display means to indicate force on the said sensors, and characterised by support means adapted to be positioned on the hand of a pilot to locate the said sensors between the hand of a pilot and the control column, the said means being arranged to locate the said sensors on substantially opposite sides of the



said control column when the pilot grasps the control column, and including an electrical signal differencer connected between the said sensors and the said display means, and means in the said signal differencer to subtract signals proportional to the force generated in one of the said sensors from that generated in the other said sensor to cause the said display means to record only the resultant force.

4,586,388

THREE FORCE BALANCED MECHANISM

Mikio Tanaka; Yoshikuni Doki; Yoshihiro Tsuruoka; Masatoshi Fujiwara, and Tatsuhide Shiga, all of Kanagawa, Japan, assignors to Tamura Electric Works, Ltd., Tokyo, Japan

Filed Nov. 8, 1983, Ser. No. 549,981

Claims priority, application Japan, Nov. 12, 1982, 57-198737

Int. Cl.[4] G01L *1/08*

U.S. Cl. 73—862.58 **10 Claims**

1. An improved three force balanced mechanism for automatically adjusting and compensating for zero point shifting occuring at a change in measuring range that comprises:

a floating pivot;

an input force transmitting member;

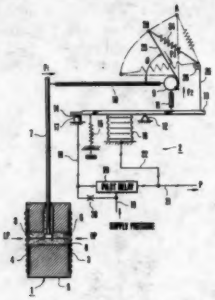
a feedback force transmitting member, one end of said input force transmitting member and one end of said feedback force transmitting member being connected to said floating pivot in different directions;

a span setting member inclined with respect to said input force transmitting member, one end of said span setting member being coupled to said floating pivot;

detecting means for detecting an input force;

restoring means, responsive to an output of said detecting means, for applying a restoring force to said feedback force transmitting member; and

spring means for applying a varying force upon said input force transmitting member and said feedback force transmitting member in accordance with movement of the other end of said span setting member, thereby automatically adjusting and compensating for said zero point shift.



4,586,389

DUST DETECTION

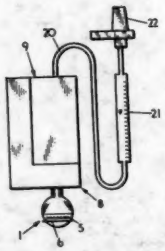
James H. Vincent; David Mark, both of Haddington; Harold Gibson, and Gordon Lynch, both of Edinburgh, all of Scotland, assignors to Coal Industry (Patents) Limited, London, England

Filed Oct. 5, 1983, Ser. No. 539,140

Claims priority, application United Kingdom, Oct. 22, 1982, 8230297

Int. Cl.⁴ G01N *1/16*

U.S. Cl. 73—863.22 **9 Claims**



7. A cascade impactor apparatus for use with an inhalable dust sampler and pump means for draining air from the inhalable dust sampler through the cascade impactor, comprising, an inlet connected to the inhalable dust sampler, an outlet connected to the pump means, a series of blocks disposed between the inlet and the outlet, each block having a transverse circular cavity extending therethrough, and an exit slot axially aligned with the inlet and outlet, wherein a portion of the circular cavity is flattened at the entry slot of all but the first block, the first block being disposed adjacent the inlet, a base plate mounted on one side of the blocks and providing a mutual closure for the transverse circular cavity for each block, a top plate mounted on the opposite side of the blocks, the top plate supporting a rotatable cylinder within each circular cavity, means for rotating in synchronization the rotatable cylinders, each entry slot becoming progressively narrowed from the inlet to the outlet, wherein each block collects fractions of progressively smaller particles, and wherein each cylinder is mounted progressively closer to the entry slots in a downstream direction.

4,586,390

NOZZLE FOR THE CONTINUOUS SEPARATION OF A REPRESENTATIVE SAMPLE FROM A DUST-BEARING GAS FOR ITS ANALYSIS

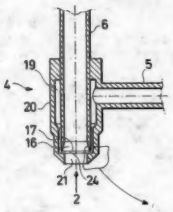
Risto J. A. Helke, Tampere, Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed Nov. 7, 1984, Ser. No. 668,963

Claims priority, application Finland, Nov. 17, 1983, 834210

Int. Cl.⁴ G01N *1/24*

U.S. Cl. 73—864.73 **10 Claims**



1. A nozzle for separating a representative sample from a gas mixture which contains a finely divided solid, in order to analyze it, the nozzle comprising a sample-taking mouth which opens into a sample-taking space, a first conduit connected to it for separating the sample and for directing it to the analysis; and a second conduit for feeding liquid into the sample-taking mouth in order to clean it and to mix the liquid with the gas sample, the second conduit, for feeding the liquid, including at least one slit-like conduit part transverse to the central axis of the sample-taking mouth of the sample-taking conduit, situated around the central axis, the liquid which keeps the mouth clean and is mixed with the gas being fed through this conduit part into the mouth, transversely to the gas flow direction and from around substantially the entire opening.

4,586,391

CROSS ARM MECHANISM IN PUSHBUTTON TUNER

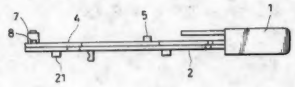
Takao Chaki, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Dec. 13, 1983, Ser. No. 561,248

Claims priority, application Japan, Dec. 14, 1982, 57-188020; Dec. 14, 1982, 188021; Dec. 14, 1982, 188024

Int. Cl.⁴ F16H *35/18*

U.S. Cl. 74—10.37 **2 Claims**



1. A cross arm mechanism in a pushbutton tuner which comprises:

an arm plate rotatably supporting a frequency setting plate;

a plate spring mounted on said arm plate for locking said frequency setting plate from the circumference thereof; and

first and second pins uniting said arm plate with said plate spring, said pins being different in height,

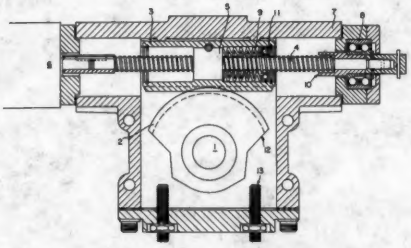
wherein said pins are a pair of tongues made by partly cutting an end portion of said arm plate, said plate spring being formed at one end portion thereof with a pair of bores engaging said tongues.

4,586,392

MOTION TRANSMITTING MECHANISM

Sven Nilsson, Partille, Sweden, assignor to SKF Nova AB, Goteborg, Sweden

Filed Nov. 25, 1983, Ser. No. 554,941
Claims priority, application Sweden, Jan. 25, 1983, 8300361
Int. Cl.[4] F16H *29/02*
U.S. Cl. 74—89.15 1 Claim



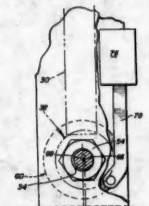
1. A motion transmitting mechanism comprising a linearly movable member (3, 5) which is displaceable by an external driving member (4, 6) between limit positions including a rest limit position at a fixed end stop having a fixed supporting surface (10) and which is driving a control member (2), said linearly movable member (3, 5) comprising a toothed rack (3) having a bore extending in the direction of movement of the rack, a rotatable screw (4) extending through the bore and co-operating with a threaded nut in the rack; an axially compressible spring (9) completely housed in said bore, and arranged so that the spring is compressed in said bore against the supporting surface when the movable member moves towards the rest limit position said axially fixed supporting surface (10) being arranged on a member which is at least partly engageable in said bore when said movable member is at said rest limit position, said spring urging the movable member with a purely axially directed force when the movable member is situated in its rest limit position at the end stop said motion transmitting mechanism including a thrust bearing movably mounted at one end of the bore of the rack facing the supporting surface, said spring disposed between said thrust bearing and nut.

4,586,393

MINIMUM FIT WORM AND GEAR DRIVE

Paul C. Mooney, Northbrook, and Theodore F. Koch, Elmhurst, both of Ill., assignors to Quick-Set Incorporated, Northbrook, Ill.

Continuation-in-part of Ser. No. 587,136, Mar. 7, 1984, abandoned. This application Jan. 9, 1985, Ser. No. 690,397
Int. Cl.[4] F16H *35/06, 1/16, 1/20, 35/08*
U.S. Cl. 74—396 15 Claims



1. In a worm and gear drive, including a gear rotatably supported to a base, a worm drivably engaging the gear, and bearings supporting the worm for rotation about its axis, the improvement comprising:

a housing supporting the worm bearings, the housing being rotatably supported to the base about a second axis, the second axis being parallel to but eccentric from the worm axis; and

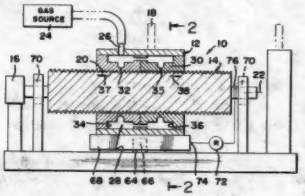
means for pivoting the bearing housing between a first position providing a minimum fit between the worm and gear and a second position providing rigid frictional locking between the worm and gear.

4,586,394

LOW NOISE LEAD SCREW POSITIONER

Gerald S. Perkins, Altadena, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 30, 1982, Ser. No. 403,849
Int. Cl.[4] F16H *1/18, 1/20, 27/02, 29/02*
U.S. Cl. 74—424.8 R 5 Claims



2. A low noise positioning apparatus, comprising:

a lead screw having an axis extending in an axial direction;

a nut lying about said screw;

a clearance space between said screw and said nut;

said nut having at least 3 holes therein with the holes being circumferentially spaced about the screw to carry pressurized gas to the clearance space between the nut and screw;

said holes each passing through a crest of a thread on said nut so as to discharge gas into the root of the thread on said screw which is complementary to said crest and;

said holes being displaced slightly from each other in an axial direction with the spacing determined by the pitch of the thread on the nut such that each of the holes passes through the crest of the nut thread,

whereby the nut is precisely supported in an orginal position in spaced relation with respect to the screw when a pressurized gas is passed through the holes in the nut into the clearance space between the nut and the screw with lateral displacement of the nut relative to the screw causing a pressure increase in the region where the spacing between the nut and screw is decreased with the pressure increase providing a restoring force to return the nut to its original position with respect to the screw.

4,586,395

LUBRICATION DEVICE IN TRANSMISSION UNIT FOR AUTOMOTIVE VEHICLES

Hisashi Fukuchi; Masaki Inui, and Hideyuki Iwata, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 3, 1984, Ser. No. 606,522
Claims priority, application Japan, May 10, 1983, 58-69519[U]
Int. Cl.[4] F16H *57/04, 1/40, 1/44*
U.S. Cl. 74—467 4 Claims

1. In a transmission unit for automative vehicles, comprising:

a casing arranged to store an amount of lubricating oil in a bottom portion thereof and having a pair of carrier portions at the opposite sides thereof;

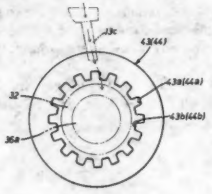
a differential gear unit arranged within said casing and hav-

ing a pair of side-journals rotatably supported by a pair of axially spaced side-bearings carried on the respective carrier portions of said casing;

a ring gear integral with said differential gear unit and in mesh with an output gear on an output shaft of said transmission unit to drive said differential gear unit;

a pair of wheel axles extending outwardly through said respective side-journals from said differential gear unit and surrounded by a pair of annular seal members carried on the respective carrier portions;

a pair of annular shim plates interposed between each of the carrier portions and each of said side-bearings to position said respective side-journals in place; and



passage means for leading lubricating oil picked up by said ring gear into a pair of annular side-spaces formed around each of said wheel axles between the respective side-bearings and the respective seal members;

wherein each of said annular shim plates is formed the inner peripheral portion thereof with a plurality of circumferentially spaced radial projections and recesses which are arranged in such a manner that a portion of the lubricating oil flowing along each outside peripheral portion of said annular shim plate is guided radially inwardly by the radial projections of said respective shim plates to flow onto each of said wheel axles for lubrication of said side-journals.

4,586,396

SPEED CHANGE OPERATING DEVICE FOR A BICYCLE

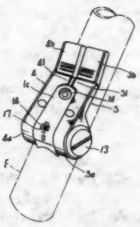
Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Jul. 3, 1984, Ser. No. 627,629

Claims priority, application Japan, Jul. 6, 1983, 58-105657[U]

Int. Cl.[4] G05G *1/06, 5/16*

U.S. Cl. 74—473 R **2 Claims**



1. A speed change operating device for a bicycle including a base member fixed to a frame of the bicycle and first and second operating levers each supported rotatably to an opposing side of said base member;

said base member comprising a body and a pair of lever shafts extending outwardly from opposite sides of said body, each operating lever having a boss supported rotatably to a said lever shaft and an operating portion extending radially outwardly from a said boss, each said operating portion having an enlarged portion projecting inwardly beyond a lateral side of said base member, said enlarged portions being positioned on opposing inside portions of said operating portions.

4,586,397

STEERING WHEEL DEVICE

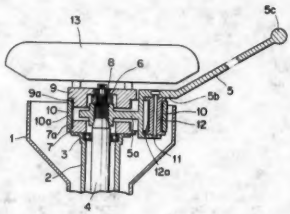
Sadao Kokubu, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakush, Aichi, Japan

Filed Nov. 27, 1984, Ser. No. 675,411

Claims priority, application Japan, Dec. 1, 1983, 58-184543[U]

Int. Cl.[4] B62D *1/04*

U.S. Cl. 74—492 **6 Claims**



1. A steering wheel device of an automobile comprising

a steering shaft;

a steering wheel having a rim section operated by a driver to rotate the steering wheel and a hub section to transmit the rotation of the steering wheel to said steering shaft, said steering wheel further having an intermediate section connecting said hub section and rim section;

a fixed member fixed to an automobile body and surrounding said steering shaft to support the same such that said fixed member is free from the rotation of the steering shaft;

a stationary member provided to surround said steering shaft such that said stationary member is free from the rotation thereof, said stationary member carrying a steering pad thereon, said fixed member and said stationary member being formed with surfaces extending at a coplanar level in parallel with said steering shaft;

a rotary member provided in said intermediate section rotatably about an axis extending in parallel with said steering shaft;

an endless flexible member passing said surfaces of the fixed member and the stationary member to provide a unitary structure therebetween, said endless flexible member further passing around said rotary member.

4,586,398

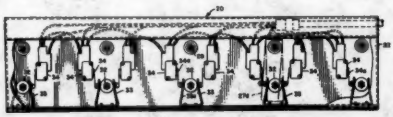
FOOT CONTROL ASSEMBLY FOR POWER-OPERATED TABLES AND THE LIKE

Leonard J. Yindra, Manitowoc, Wis., assignor to Hamilton Industries, Two Rivers, Wis.

Filed Sep. 29, 1983, Ser. No. 537,344

Int. Cl.[4] G05G *1/14*

U.S. Cl. 74—512 **13 Claims**



1. A foot control for power-operated equipment having reversible power-driven functions, comprising a housing adapted to extend along a floor surface; said housing having at least three actuating members spaced laterally from each other

to define at least two adjacent operating stations; each of said adjacent operating stations being wide enough to receive at least the toe portion of an operator's foot between the actuating members defining the same; one of said actuating members being disposed between and partially defining both of said actuating stations; each of said actuating members being mounted upon said housing for horizontal movement from a neutral position towards and away from the operating station immediately adjacent thereto; spring means urging and normally maintaining said actuating members in their neutral positions; first means operatively associated with two of said actuating members defining one of said stations for activating a first of said reversible power functions; second means operatively associated with two of said actuating members defining a station adjacent said one station for activating a second of said reversible power functions; said one of said actuating members disposed between said adjacent operating stations being operatively associated with both of said first and second means for selectively actuating each of said first and second power functions.

4,586,399

HANDCART HANDLE HEIGHT ADJUSTING MECHANISM

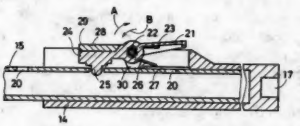
Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

Filed Oct. 11, 1984, Ser. No. 659,668

Claims priority, application Japan, Nov. 4, 1983, 58-171762[U]

Int. Cl.⁴ B62K *21/16*; B62B *7/12*; F16B *7/10*

U.S. Cl. 74—551.3 **1 Claim**



1. A mechanism for adjusting the height of a handle (11) of a handcart, comprising said handle (11), and including an upper rod portion (14) having a grip (16), and a lower rod portion (15) for vertically and slidably supporting the upper rod portion (14); one of said upper and lower rod portions (14, 15) forming a sleeve, while the respective other rod portion forms an insert adapted to be received with one insert end in said sleeve; said insert comprising a plurality of vertically aligned engaging holes (20); said sleeve having a lever (21) turnably attached to said sleeve, said lever having an engaging projection (25) adapted to fit in any one of said engaging holes (20); spring means (26) arranged for constantly urging said lever (21) in a direction which allows said engaging projection (25) to fit in any one of said engaging holes (20); said sleeve further comprising a stopper (28) turnably attached to said sleeve for preventing a cancellation of the engagement between said engaging projection (25) and a respective engaging hole (20); said stopper (28) comprising a presser portion (29) having an area sufficient in size for covering at least part of said lever (21) when said stopper (28) is in a predetermined positional relation to said lever (21), and brake portions (30) extending outwardly of an axis of rotation of said stopper (28) for contacting said insert when said presser portion (29) is covering at least part of said lever (21), so as to stop a turning movement of said stopper (28), whereby when said engaging projection is in engagement with a respective engaging hole, the turning movement of said lever (21) is inhibited and so that cancellation of the engagement between said engaging projection (25) and said engaging hole (20) is avoided.

4,586,400

SOFT SHAFT INTERCONNECTING DEVICE

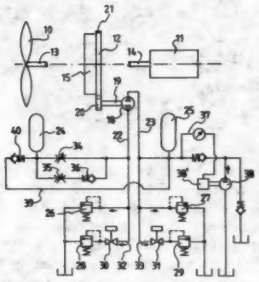
Ingemar Nygren, Danderyd, Sweden, assignor to Svenska Varv Vindenergi AB, Gothenburg, Sweden

Filed Jun. 9, 1983, Ser. No. 502,709

Claims priority, application Sweden, Jun. 24, 1982, 820394

Int. Cl.⁴ F16H *37/06*

U.S. Cl. 74—675 **11 Claims**



1. A soft shaft connecting device for use between a prime mover having an output shaft and a machine driven by the prime mover having an input shaft coaxially aligned with the output shaft comprising:

a planetary gearing having a sun gear connected to one of said shafts, a carrier connected to the other of said shafts, planetary gears rotatably mounted on said carrier and meshing with said sun gear, and a ring gear mounted for rotation coaxially with respect to said shafts enclosing and operatively meshing with said planetary gears;

a hydraulic machine operable as a pump and a motor operatively connected to said ring gear so that it operates as a pump when driven by said ring gear and as a motor driven by hydraulic fluid pressure to drive said ring gear;

conduit means for conducting hydraulic fluid operatively connected to said hydraulic machine;

a high pressure accumulator and a low pressure accumulator operatively connected to said conduit means so that said hydraulic machine is connected between said accumulators; and

means to control the flow of hydraulic fluid through said hydraulic machine to attenuate differences in torque between said input and output shaft comprising,

a first adjustable throttling means operatively connected to said conduit means between said hydraulic machine and said high pressure accumulator,

a shunt pipe connected to said conduit means in parallel with said first throttling means,

a second adjustable throttling means operatively connected to said shunt pipe,

a non-return valve operatively connected to said shunt pipe in series with said second throttling means to open in the direction of fluid flow towards said high pressure accumulator, and

an overflow valve operatively connected to said conduit means on the same side of said hydraulic machine as said high pressure accumulator and operable to open at a predetermined pressure to limit the maximum fluid pressure in said conduit means.

4,586,401

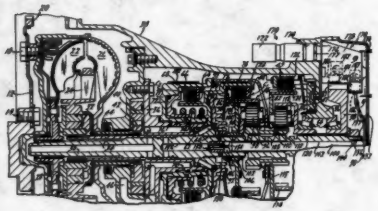
TRANSMISSION SPEED SENSOR ARRANGEMENT

Thomas D. Nogle, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 16, 1984, Ser. No. 600,637

Int. Cl.[4] F16H *3/74, 37/08;* G01P *3/48;* F16C *3/00*

U.S. Cl. 74—752 A 3 Claims



1. In an engine driven vehicle having an engine extending transversely with respect to the vehicle at one end thereof, a pair of wheels at the same end of said vehicle, and automatic drive transmission means connecting said engine to said wheels, said automatic drive transmission means including a housing attached to said vehicle, said housing having a torque converter section, a speed change section adjacent said torque converter section, and a differential and transfer section; said engine having a crankshaft, a torque converter in said torque converter section of said housing rotatable on the same axis as said crankshaft and adapted to be driven by said engine crankshaft, said torque converter drivingly connected to one outer end of a transmission input shaft, said input shaft having its other inner end located about mid-way through said speed change section, a speed change section output shaft mounted coaxial with said input shaft in said speed change section with its inner end adjacent said input shaft inner end and its outer free end extending beyond said speed change section, an output gear having peripheral teeth formed thereon, said output gear connected on said output shaft outer free end such that said output shaft and said output gear rotate on said input shaft axis, a transfer shaft having a transfer gear engaged with said output gear, said output shaft having a bore extending axially therethrough, the improvement wherein; a speed sensor shaft having a speed sensor wheel with peripheral teeth formed thereon fixed on the free outer end thereof, means journally supporting said speed shaft concentrically within said output shaft bore such that said speed wheel is axially spaced closely adjacent to said output gear, coupling means connecting said speed shaft inner end with the adjacent inner end of said input shaft such that said speed shaft rotates in unison with said input shaft, said speed wheel being positioned a predetermined axially distance beyond said output shaft free end, a pair of electrical pickup speed wheel and output gear sensors encapsulated within a single electromagentic remote sensing unit supported within said housing, said speed wheel pickup sensor located juxtaposed said speed wheel teeth and said output gear sensor located juxtaposed said output gear teeth, each said speed wheel and output gear sensor operative for sensing the angular position of its associated speed wheel teeth and output gear teeth, said speed wheel sensor being displaced axially from said input shaft inner end a distance substantially equal to the axial length of said output shaft; whereby the pulsed electrical signals generated by said speed wheel sensor and output gear sensor having frequencies proportional to the rotational speed of their associated speed wheel and output gear, respectively; such that the rotational speed of both said speed wheel and said output gear and thus their respective transmission input and output shafts rotational speeds are obtained from said pair of sensors located with said single remote unit, said speed wheel having a diameter a predetermined offset distance less than the diameter of said output gear, and wherein said speed wheel sensor is radially offset inwardly from said output gear sensor a distance substantially equal to said offset distance such that said speed wheel sensor does not receive false speed signals from said speed wheel teeth and said output gear sensor does not receive false speed signals from said output gear teeth.

4,586,402

DRIVE FOR TWO-WORM EXTRUDER

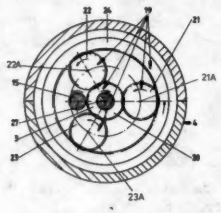
Heinrich Schäfer, Rosdorf, Fed. Rep. of Germany, assignor to Battenfeld Extrusionstechnik GmbH, Bad Oeynhausen, Fed. Rep. of Germany

Filed Oct. 7, 1983, Ser. No. 539,912

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1982, 3237257

Int. Cl.[4] F16H *1/32*

U.S. Cl. 74—801 9 Claims



1. A drive for a two-worm extruder, the drive comprising:

a housing;

an electric motor secured to the housing and having a motor output rotatable about a motor axis therein;

a planetary gear transmission in the housing including

a sun gear defining a sun-gear axis,

a ring gear coaxially surrounding the sun gear and rotatable in the housing about the sun-gear axis, and

a plurality of planet gears in mesh between the sun and ring gear, rotatable in the housing about ring-gear axes fixed in the housing and angularly equispaced about the axis, and including a driven planet gear and at least two idler planet gears;

a first output shaft extending axially through the planetary transmission within the ring gear and having an outer end adapted to be secured to one of the worms of the extruder;

a second output shaft carried on the sun gear and having an outer end adjacent that of the first output shaft and adapted to be secured to the other worm of the extruder; and

force-splitting means including

a splitter gear;

a planetary shaft fixed to and extending between the driven planetary gear and the splitter gear;

another splitter gear fixed to the first output shaft; and

a motor gear carried on the motor output and meshing directly with both of the splitter gears for driving the first shaft and the planet gear from the motor output.

4,586,403

ADAPTIVELY CALIBRATED SENSING MECHANISM FOR AN ENGINE DEMAND DEVICE

Ronald A. Lee, Brownsburg; William L. McCoy, Mooresville, and Ted M. McQuinn, Carmel, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 5, 1984, Ser. No. 568,355

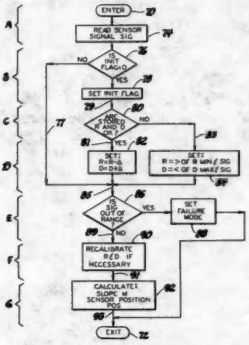
Int. Cl.[4] B60K *41/04;* G01M *15/00;* G01C *25/00*

U.S. Cl. 74—866 6 Claims

1. In a mechanism for sensing the position of an engine demand device positionable between upper and lower limit positions where such mechanism includes a sensor for providing an output signal the magnitude of which varies in relation to the position of the demand device, and a control unit which provides an indication of the demand device position as a

function of the sensor output signal relative to previously stored upper and lower reference values representative of sensor output signals nominally corresponding to the limit positions of the demand device, apparatus for compensating the demand device position indication for wear and other like sources of error which affect the magnitude of the sensor output signal, comprising:

first means effective during engine operation for comparing the sensor output signal value with the stored upper and lower reference values and for replacing the upper or lower reference values with the sensor output signal value if the sensor output signal value is respectively above or below the corresponding upper or lower reference values,



thereby to compensate the demand device position indication for errors which tend to expand the range of sensor output signal values outside the range defined by the previously stored upper and lower reference values; and

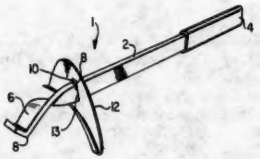
second means effective at the initiation of each period of engine operation for altering the previously stored upper and lower reference values by a predetermined amount and in a sense to contract the range of sensor output signal values defined thereby so as to enable the first means to additionally compensate the demand device position indication for errors which tend to contract the range of sensor output signal values within the range defined by the upper and lower reference values prior to the alteration.

4,586,404

CONTAINER PAIL OPENER

Vern Ginther, Penticton, Canada, assignor to Ver-Nor Development Corporation, Canada

Filed Aug. 20, 1984, Ser. No. 642,172
Int. Cl.[4] B67B *7/00*
U.S. Cl. 81—3.57 **8 Claims**



1. An opener for removing tight fitting, removable container pail lids, the lid being of the type including a central, circular body portion to cover a pail opening, a peripheral annular portion elevated with respect to the body portion and a continuous, circular skirt-like flange downwardly depending from the annular portion to circumscribe the container pail when in position, the opener comprising:

an elongated main body section of uniform cross-section and having an upper edge, a lower edge, sides, a front end and a rear handle end;

a main fulcrum surface secured to the main body section at the front end and situated with respect to the lower edge of the main body section, so as to bear upon the body portion of the lid to be removed from the pail when the handle end of the opener is pried upwardly when in use;

a notch extending transversely across the upper edge of the main body section spaced from but proximal to the front end thereof the notch being of predetermined width in the longitudinal direction of the main body section;

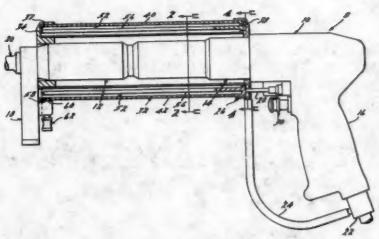
a flange-engaging member comprising a plate having an aperture within which the main body section is received, the plate being moveably seated in the notch on the main body section and having a forwardly and upwardly angled lower flange-engaging lip, the width of the notch being sufficient to provide relative movement of the plate in the longitudinal direction within the notch, with respect to the main body section, the lip being positioned with respect to the main fulcrum surface and lower edge of the main body section so that in operation when it engages the flange of the lid and upward movement is effected at the handle end of the main body section so that the main fulcrum surface bears on the body portion of the lid, the lower edge of the main body section in front of the plate will bear against the annular elevated peripheral portion of the lid, in operation the lip of the plate will move rearwardly to effect outward distortion of the flange of the lid thereby preventing removal of the lid.

4,586,405

NUT DRIVER

Imre Berecz, 26562 Shane Dr., El Toro, Calif. 92630

Filed Jul. 19, 1985, Ser. No. 756,501
Int. Cl.[4] B25B *23/02*
U.S. Cl. 81—57.37 **2 Claims**



1. In a nut driver comprising a frame having a generally cylindrical portion with a motor and a nut driving mechanism disposed internally thereof, an improved cylindrical nut magazine coaxially related to the cylindrical portion of the frame of said nut driver, said magazine comprising,

a pair of semi-cylindrical magazine sections each having a plurality of elongated, aligned circumferentially spaced fastener chambers therein, a front magazine holder on said frame having an annular channel for the acceptance of one end portion of said magazine, and

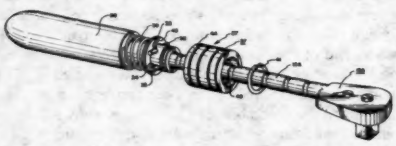
a rear magazine holder on said frame having an annular channel for the acceptance of an opposite end portion of said magazine.

4,586,406

EXTENSIBLE WRENCH CONSTRUCTION

Willis H. Howard, 7940 S. 10th East, Sandy, Utah 84070

Filed Sep. 20, 1984, Ser. No. 652,277
Int. Cl.[4] B25G 1/04
U.S. Cl. 81—177.2 3 Claims



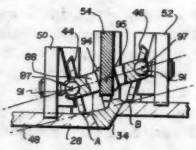
1. A wrench construction including, in combination: a handle having an axial bore, a medial forwardly-facing reaction shoulder, and a forward body portion of reduced dimension and extending forwardly of said reaction shoulder, said forward body portion including a pair of transverse dimetrically oppositely disposed forwardly undercut slots intersecting said bore and oppositely angulated rearwardly and outwardly; an elongate shaft slidably disposed in said bore of said handle and provided with a work-performing head, said shaft having a plurality of mutually spaced annular grooves; a pair of detent pins laterally slidably disposed in respective ones of said slots and releasably seated in a selected one of said grooves; compression coil spring means surrounding said forward body portion and operably disposed between and acting upon said reaction shoulder and said detent pins; and manually operable sleeve means surrounding said spring means engaging said detent pins, and being spring-biased by said compression coil spring means in a direction along the longitudinal axis of said handle, for urging said detent pins in respective angulated rearward and outward directions within said slots against the bias of said compression coil spring means, whereby to effect, through pronounced rearward longitudinal movement of said sleeve means, an unlocking disengagement between said detent pins and said selected one of said grooves, and thereby permit said shaft to be longitudinally moved and reset, relative to said handle, for a new lock of said detent pins, under the pressure of said compression coil spring means when said sleeve means is manually released, relative to another one of said grooves of said shaft, said compression coil spring means biasing said sleeve means against said detent pins.

4,586,407

LATHE TOOL FOR REMOVING AXIAL PERIPHERAL IRREGULARITY FROM SURFACE OF CYLINDRICAL WORKPIECE

Lawson H. Nall, Folsom, Calif., assignor to Tri Tool, Inc., Rancho Cordova, Calif.

Continuation-in-part of Ser. No. 566,421, Dec. 28, 1983, abandoned. This application Jan. 3, 1984, Ser. No. 567,497
Int. Cl.[4] B23B 1/00, 5/16
U.S. Cl. 82—1 C 51 Claims



45. A method for machining a peripheral surface of a cylindrical or tubular workpiece to remove an axially irregular portion of such surface using a rotary, lathe-type machine tool including an axially movable cutter arranged to circumscribe the peripheral surface of the workpiece in a transverse cutting plane located at the axial position of the cutter, comprising:

(a) mounting the workpiece on the tool with the cutting plane on one side of the irregular peripheral surface portion;

(b) establishing two axially spaced independent reference points having a fixed geometric correlation with the radial location of the peripheral surface of the workpiece on opposite sides of the axially irregular peripheral portion and on opposite sides of the cutter location;

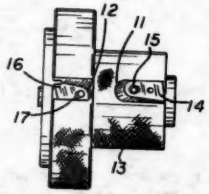
(c) causing the cutter to substantially axially traverse an imaginary line connecting said reference points while circumscribing the workpiece peripheral surface in cutting relationship, with the position of said axially spaced reference points maintained on opposite axially spaced sides of the cutter location.

4,586,408

PLASTIC PIPE CHAMFERING TOOL

Erwin P. Goldner, 2727 Felton St., San Diego, Calif. 92104

Filed Feb. 13, 1985, Ser. No. 701,342
Int. Cl.[4] B23B 5/16
U.S. Cl. 82—4 C 7 Claims



1. A tool for chamfering square-cut ends of plastic pipe comprising:

a main body having a first circular groove shaped and sized to receive a first size of plastic pipe;

a cutting blade mounted in a recess connecting the exterior surface of said main body with the periphery of said first groove;

said blade being positioned transversely with respect to the circumference of a pipe of said first size inserted in said first groove;

said blade also being positioned and angled to cut a chamfer on the end of a pipe of said first size inserted in said first groove when said tool is axially rotated about said end and pressure is exerted on said tool in an axial direction toward said pipe end; and

said recess and blade being angled and positioned to expell cuttings from the chamfering process from said main body through said recess.

4,586,409

SLICING MACHINE FOR COLD CUTS

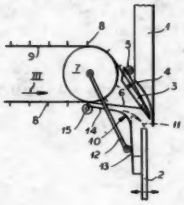
Fritz Kuchler, Klagenfurt, Austria, assignor to Brain Dust Patents Establishment, Vaduz, Liechtenstein

Filed Apr. 2, 1984, Ser. No. 595,949
Claims priority, application Austria, Apr. 1, 1983, 1173/83
Int. Cl.[4] B26D 7/32
U.S. Cl. 83—112 10 Claims

1. In a slicing machine which comprises a rotatable blade, a carriage for goods to be sliced displaceable relative to said blade whereby a slice is formed at a slicing speed along a rear side of said blade, a blade cleaner disposed along said rear side of said blade for deflecting said slice away from said blade, said blade cleaner having guiding surfaces at an acute angle with said blade and a slice conveyor spaced from said rear side of

said blade for collecting said slice therefrom, the improvement which comprises:

a plurality of gripper bands in mutually parallel spaced-apart relationship, and said blade cleaner being formed with a multiplicity of spaced apart guide members, said gripper bands passing respectively around which said guide members;



a guide roller at one end of to said conveyor, said bands passing around said guide roller for carrying slices onto said conveyor; and

means juxtaposed with said gripper bands for applying said slices thereagainst.

4,586,410

APPARATUS FOR PRODUCING OPEN-SIDED V-BELTS

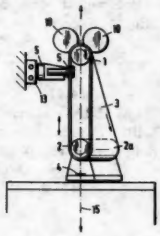
Horst Müller-Erwig, Neustadt, and Wilhelm Brand, Hanover, both of Fed. Rep. of Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Fed. Rep. of Germany

Filed Apr. 11, 1985, Ser. No. 721,945

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1984, 3414673; Nov. 30, 1984, 3443685

Int. Cl.⁴ B26D *7/14*

U.S. Cl. 83—175 **6 Claims**



1. An apparatus for cutting open-sided V-belts from a vulcanised, sleeve-shaped roll, having first and second opposed lateral edges, roll support means comprising first and second rotatable roller means receiving said sleeve-shaped roll thereon, means mounting said first roller means for rotation in a non-vertically displaceable, non-pivotal manner, said first and second roller means each having corresponding first and second opposed end regions, roller support means carrying said second roller means for rotation, said roller support means comprising a base member, pivot axis means mounting said base member for permitting pivotal movement of said base member about said axis, said pivot axis being located closely adjacent said first end region of said second roller means, bearing means mounted on said base member, said bearing means rotatably receiving said second end region of said second roller means, said first and second roller means lying in planes parallel to one another and whereby said pivotal movement of said base member carrying said second roller means causes said second roller means to remain in said plane parallel to said first roller means, and whereby, when said roll is disposed on said roll support means, said first lateral edge of said roll is disposed in said first end region of said roller and said second lateral edge of said roll is disposed in said second end region of said rollers, stop means engaging said roll, said stop means acting on said second lateral edge of said roll and tending to move said second lateral edge of said roll towards said first end region of said rollers and cutter means disposed adjacent said first roller means for cutting said roll into belts.

4,586,411

DEVICE FOR MANUFACTURING OF HEMMED PIECES OF CLOTH CUT FROM A WEB

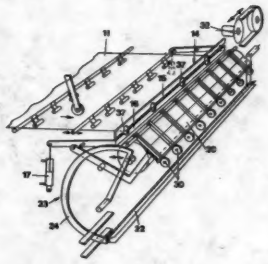
Caj Koivula, Borås, Sweden, assignor to Akab of Sweden AB, Borås, Sweden

Filed Jul. 31, 1984, Ser. No. 636,262

Claims priority, application Sweden, Aug. 3, 1983, 8304244

Int. Cl.⁴ D06H *7/02*; B26D *7/14*

U.S. Cl. 83—175 **5 Claims**



1. Apparatus for cutting lengths of cloth from an elongate web, the web having pile sections separated by transverse pile-free bands, the apparatus comprising a table along which the web can be fed longitudinally, a straightening device comprising a pair of rulers extending laterally across the table and being adjustable relative to each other for the selective passage therebetween of only the pile-free bands of the web and of the pile sections, a transfer device and first and second vertically spaced transverse conveyor devices forwardly of the straightening device, the transfer device having seizing means for grabbing a forward edge of the web extending forwardly from the straightening device and transferring same through the first conveyor device to the second conveyor device in a manner advancing a measured length of the web, cutter means for transversely cutting the web forwardly of the straightening means after transfer of the forward edge to the second conveyor device, and arresting means on the first and second conveyor devices for arresting the forward edge and the rearward edge of a cut piece of cloth for transport thereof by the conveyor devices to a trimming device.

4,586,412

ROTARY TIN-TIE CUTTING MECHANISM FOR A PACKAGING MACHINE

Gerald R. Johnson, Deronda, Wis., assignor to Doboy Packaging Machinery, Inc., New Richmond, Wis.

Filed Aug. 9, 1984, Ser. No. 639,025

Int. Cl.⁴ B26B *51/04*

U.S. Cl. 83—205 **4 Claims**

1. In a bag sealing machine of the type including conveyor means for continuously transporting filled bags past a tin-tie strip bonding station, apparatus for supplying cut lengths of said tin-tie strips to said bonding station in synchronism with the arrival of the continuously moving filled bags, said apparatus comprising in combination:

(a) a frame;

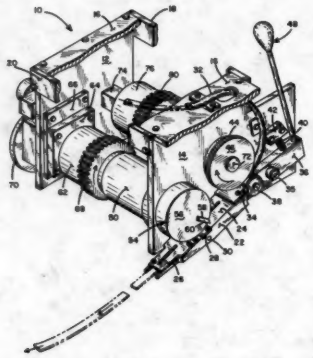
(b) first and second shafts journaled for rotation in said frame;

(c) continuously rotating drive means operatively coupled to said conveyor means and driven at a speed proportional to the speed of said conveyor means;

(d) guide means secured to said frame for routing flexible strip material along a predetermined path terminating in a close parallel relation to the path of travel of said bags along said conveyor means;

(e) friction roller means disposed on said first shaft and positioned relative to said guide means selectively for engaging said strip material and moving said strip material along said guide means;

(f) a rotary cutter head attached to said second shaft and positioned relative to said guide means for periodically severing said strip material passing along said guide means;



(g) a first electrically actuated clutch for selectively coupling said continuously rotating drive means to said first shaft for driving said friction roller means independent of said rotary cutter head;

(h) a second electrically actuated clutch for selectively coupling said continuously rotating drive means to said second shaft for driving said rotary cutter head from a home position to a strip material severing position and back to said home position; and

(i) means responsive to the presence of a bag at a given location along said conveyor means for applying control signals to said first and second electrically actuated clutches to continuously advance a length of said strip material through said guide means and to cut a predetermined length of said strip material from a supply source with the cut length of strip material being moved at the same relative velocity as the bag as the two enter said bonding station.

4,586,413

SIGN MAKING MACHINE

Harvey P. Block, Westport, Conn., assignor to U.S. Highway Products, Inc., Orangeburg, N.Y.

Continuation-in-part of Ser. No. 651,607, Sep. 17, 1984. This application Feb. 6, 1985, Ser. No. 698,605

Int. Cl.[4] B26D 7/27

U.S. Cl. 83—522 **11 Claims**

1. A sign making machine comprising:

a frame;

a power unit attached to said frame;

a hydraulic cylinder attached to said frame and hydraulically connected to said power unit, said hydraulic cylinder having a piston rod extending downwardly;

a platen mounted on the bottom of said piston rod;

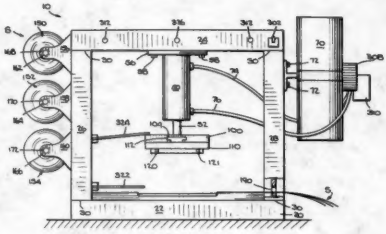
a plurality of dies, each for a unique symbol;

means for mounting one of said plurality of dies on said platen;

means for holding sheet material from which selected symbols are to be made by said sign making machine;

a cutting surface mounted on a bottom portion of said frame beneath said platen, said cutting surface including a track means extending from one portion of said frame adjacent said means for holding sheet material to another portion of said frame where said selected symbols exit from said sign making machine;

each of said dies including a sharp cutting means extending downwardly therefrom, said sharp cutting means being



formed in the shape of one of said selected symbols, each of said dies also including a unique indicia means for indicating a unique width quotient of a respective symbol; and

means on said frame including indicia correlating to the width quotient indicia for advancing said sheet material in said track by a distance equal to said unique width quotient of said selected symbol plus the unique width quotient of the next selected symbol to be made plus the spacing between selected symbols, whereby actuation of said piston rod forces said die into said sheet material and against said cutting surface to form said one of said selected symbols.

4,586,414

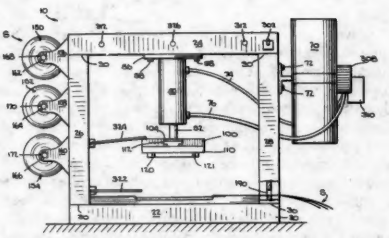
SIGN MAKING MACHINE

Harvey P. Block, Wilton, Conn., assignor to U.S. Highway Products, Inc., Orangeburg, Nebr.W YORK

Filed Sep. 17, 1984, Ser. No. 651,607

Int. Cl.[4] B26D 7/27

U.S. Cl. 83—522 **12 Claims**



1. A sign making machine comprising:

a frame;

a power unit attached to said frame;

a hydraulic cylinder attached to said frame and hydraulically connected to said power unit, said hydraulic cylinder having a piston rod extending downwardly;

a platen mounted on the bottom of said piston rod;

a plurality of dies, each for a unique symbol;

means for mounting one of said plurality of dies on said platen;

means for holding sheet material from which selected symbols are to be made by said sign making machine;

a cutting surface mounted on a bottom portion of said frame beneath said platen, said cutting surface including a track means extending from one portion of said frame adjacent said means for holding sheet material to another portion of said frame where said selected symbols exit from said sign making machine;

each of said dies including a sharp cutting means extending downwardly therefrom, said sharp cutting means being formed in the shape of a unique symbol, each of said dies also including means for uniquely indicating two edges of said unique symbol on said sheet material when said sheet material is in place in said track means beneath said die; and

means on said frame for indicating how far to advance the indication on said sheet material in said track to provide a desired spacing between said one of said selected and another of said selected symbols, whereby actuation of said piston rod forces said die into said sheet material and against said cutting surface to form said one of said selected symbols and mark said sides for alignment with said indicating means when said another of said selected symbols is to be made.

4,586,415

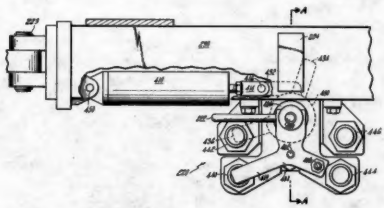
ASSEMBLY FOR EFFECTING VERTICAL AND ROTATIONAL MOTION

Christopher Pali, Fort Wayne, Ind., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Jun. 4, 1984, Ser. No. 617,308

Int. Cl.[4] B26D *5/04;* **B65H** *19/20*

U.S. Cl. 83—564 **8 Claims**



1. Apparatus for displacing a working member both vertically and rotationally which comprises:

a sleeve mounted for rotational displacement within a frame;

a shaft slidably mounted within the sleeve;

means rotationally securing the sleeve to the shaft such that rotation of either the sleeve or shaft effects rotation of the other;

a hub fixed to the shaft and defining means for securing the working member to the hub such that the working member is displaced vertically by sliding movement of the shaft and displaced rotationally by rotation of the sleeve and shaft;

a vertical actuator for effecting vertical motion;

yoke means connecting the vertical actuator to the hub for translating vertical motion from the vertical actuator to the hub without limiting rotational displacement of the hub;

collar means connected to the sleeve; and

a rotational actuator connected to the collar means for displacing the collar means to cause rotational motion of the sleeve.

4,586,416

RHYTHM GENERATING APPARATUS OF AN ELECTRONIC MUSICAL INSTRUMENT

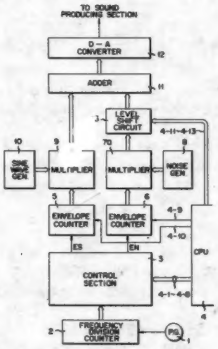
Shigenori Sano, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 367,914, Apr. 13, 1982, abandoned. This application Aug. 27, 1984, Ser. No. 644,665

Claims priority, application Japan, Apr. 20, 1981, 56-58425; Apr. 20, 1981, 56-58426; Apr. 20, 1981, 56-58427

Int. Cl.[4] G10H *1/40, 1/46*

U.S. Cl. 84—1.03 **7 Claims**



1. A rhythm generating apparatus for an electronic musical instrument, comprising:

envelope data generating means for generating digital rhythm envelope data;

means coupled to said envelope data generating means for generating a plurality of different kinds of digital rhythm sound source waveform data in response to the envelope data generated from said envelope data generating means, and for outputting amplitude data the envelope of which is controlled;

amplifying means provided for at least one of said plurality of different kinds of rhythm sound source waveform data, said amplifying means having a variable amplification factor and being arranged to digitally amplify a selected one of said amplitude data and said envelope data; and

means for synthesizing selectively each of said plurality of different kinds of rhythm sound source waveform data as envelope-controlled and amplified by said amplifying means, and for generating digital composite rhythm sound data, said amplification factor of said amplifying means being varied so that the volume ratio of said plurality of different kinds of rhythm sound source data is correspondingly varied.

4,586,417

ELECTRONIC MUSICAL INSTRUMENTS PROVIDED WITH REVERBERATION TONE GENERATING APPARATUS

Mitsumi Kato, and Tsuyoshi Futamase, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Continuation of Ser. No. 400,144, Jul. 20, 1982, abandoned. This application Oct. 5, 1984, Ser. No. 658,139

Claims priority, application Japan, Jul. 28, 1981, 56-118112; Aug. 31, 1981, 56-137298; Sep. 2, 1981, 56-138035

Int. Cl.[4] G10H *1/02, 1/18, 7/00*

U.S. Cl. 84—1.17 **9 Claims**

1. An electronic musical instrument comprising:

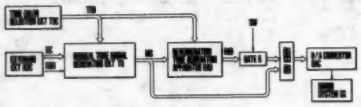
a plurality of keyboards, each of which includes a plurality of keys;

musical tone generating means for generating musical tone

signals corresponding to said plurality of keyboards respectively;

selecting means for selecting a musical tone signal corresponding to a specified keyboard among said musical tone signals; and

reverberation effect imparting means for imparing a reverberation effect to said selected musical tone signal to produce a reverberation tone signal;



said reverberation effect imparting means comprising:

delay length data generating means for generating delay length data; and

delayed musical tone generating means for delaying said selected musical tone signal by time length represented by said delay length data to produce said reverberation tone signal.

4,586,418

ADJUSTABLE END PIN FOR THE CELLO

Mischa Stahlhammer, Heleneborgsgatan 30 A, S-117 32 Stockholm, Sweden

PCT No. PCT/SE83/00176, § 371 Date Dec. 30, 1983, § 102(e) Date Dec. 30, 1983, PCT Pub. No. WO83/04126, PCT Pub. Date Nov. 24, 1983

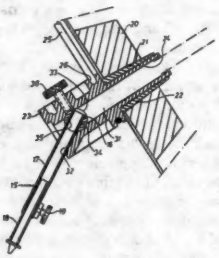
Continuation of Ser. No. 573,931, Dec. 30, 1983, abandoned.

This PCT application May 3, 1983, Ser. No. 757,188

Claims priority, application Sweden, May 14, 1982, 8203048

Int. Cl.[4] G10D *1/02*

U.S. Cl. 84—280 **5 Claims**



1. An adjustable end pin arrangement for a cello having a base with an end pin receiving aperture therethrough, comprising:

a fitting adapted to be mounted in said cello aperture, said fitting having an internal, cylindrical bore, said bore having a recess at its lower end;

a sleeve mounted in said fitting, said sleeve having a bore therethrough, and said sleeve being constrained to rotational movement within said fitting, said rotational movement bringing said sleeve bore into and out of register with said fitting bore;

an end pin having an inner end, said end pin being slidably received in said fitting bore and in said sleeve bore, said end pin prohibiting rotation of said sleeve except when said inner end has been pulled out sufficiently far to lie within said sleeve bore, whereby rotation of said sleeve is permitted, said rotation moving said end pin into said recess; and

means for locking said sleeve in any desired, rotated position.

4,586,419

DUPLEX VALVES AND METHODS FOR THEIR USE

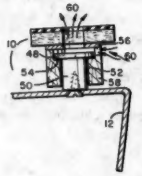
Peter J. Gerger, Jr., 7640 Waters Rd., Cheltenham, Pa. 19012

Continuation of Ser. No. 479,577, Mar. 28, 1983, abandoned.

This application Jun. 12, 1985, Ser. No. 744,291

Int. Cl.[4] G10B *3/10*

U.S. Cl. 84—335 **5 Claims**



1. A pneumatic duplex valve for regulating the flow of air from a wind chest having a pneumatic pressure through an orifice to a pneumatic work chamber, said wind chest having a pneumatic pressure higher than the work chamber, comprising a principle valve having a rear surface and a seating surface seatable on said orifice, at least one venting channel extending through said principle valve and communicating with said orifice, and an initial valve having a seating surface seatable on the venting channel at the rear surface of the principle valve.

4,586,420

SYSTEM FOR FIRING A PROPELLENT CHARGE BY PYROTECHNICAL TRANSMISSION

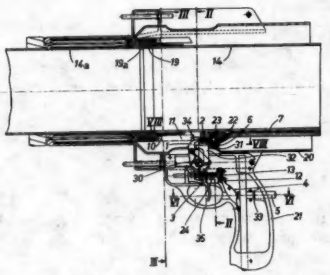
Paul Toutin, St-Aubin-sur-Gaillon, France, assignor to Societe Europeenne de Propulsion, Puteaux, France

Filed Oct. 12, 1983, Ser. No. 541,072

Claims priority, application France, Oct. 14, 1982, 82 17226

Int. Cl.[4] F41F *15/00*

U.S. Cl. 89—1.702 **9 Claims**



1. A fire-arm comprising a firing tube having a longitudinal axis and adapted to contain therein a propellent charge, a primer, a hammer located opposite the primer, said hammer and said primer being positioned excentrically with respect to the axis of the firing tube, a pyrotechnic transmission chain for connecting the primer to the propellent charge and transmitting the whole energy from the hammer to the propellent charge, mechanical means for actuating the hammer, and mechanical breaking means for breaking the pyrotechnic transmission chain during storage; wherein the said mechanical means for actuating the hammer cooperate with said mechanical breaking means to cause the pyrotechnic chain to come into an unbroken state when the hammer moves under the effect of said mechanical means for actuating the hammer, and spring means cooperating with said mechanical breaking means to return the latter to their initial position breaking the pyrotech-

nic transmission chain when said mechanical means for actuating the hammer are released.

4,586,421

UNDERWATER WEAPON SYSTEMS

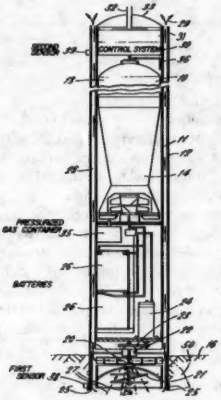
Christopher D. D. Hickey, Haywards Heath, and Bernhard D. Parker, Morden, both of United Kingdom, assignors to Underwater Storage Limited, Sussex, United Kingdom

Filed Oct. 27, 1983, Ser. No. 546,196

Claims priority, application United Kingdom, Oct. 28, 1982, 8230843; Dec. 10, 1982, 8235284

Int. Cl.⁴ F41F *3/042, 3/07*

U.S. Cl. 89—1.810 **9 Claims**



1. An underwater weapon system comprising a self-propelled weapon, an elongate enclosure for the weapon, the weapon having first and second opposite ends, a center of gravity disposed between said ends and a center of buoyancy disposed between said ends, the center of buoyancy being located between the center of gravity and said first end of the weapon whereby the weapon sinks in seawater with said first end uppermost and said second end lowermost, the weapon enclosure at said second end having rotary material displacing means thereon for cutting into and displacing material on the sea bed from beneath the container to allow the weapon to sink into the sea bed, the enclosure for the weapon comprising an outer elongate container and an inner water-tight container disposed within the outer container and containing the weapon and further comprising ejection means for causing the weapon to break out from the enclosure through the sea bed overlying the enclosure to activate the weapon.

4,586,422

IN-LINE ANNULAR PISTON FIXED BOLT REGENERATIVE VARIABLE CHARGE LIQUID PROPELLANT GUN WITH VARIABLE HYDRAULIC CONTROL OF PISTON

Inder K. Magoon, Pittsfield, Mass., assignor to General Electric Company, Fairfield, Conn.

Filed Apr. 10, 1984, Ser. No. 598,783

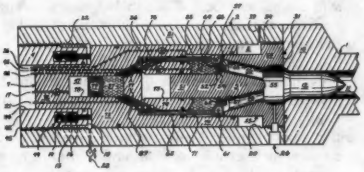
Int. Cl.⁴ F41F *1/04*

U.S. Cl. 89—7 **17 Claims**

9. In a direct injection regenerative liquid propellant gun structure having a breech casing defining a breech bore having a forward barrel end and an aft breech end, the improvement comprising the combination of:

a fixed member within said breech bore extending from a supporting member near said barrel end aftwardly toward said breech end, said fixed member being generally cylindrical but having an enlarged portion near said supporting member;

a differential area injection piston having a head dividing the volume within said breech bore between a combustion chamber at said barrel end on the forward side of said piston head and a propellant reservoir on the aft side of said piston head, said differential area piston having a cut out portion for overrunning said fixed member as said piston moves along said fixed member from a gun charged disposition in which said cut out portion is in register with



and forms a seal with said enlarged portion of said fixed member to a gun discharged disposition in response to the pressure of combustion gas generated in said combustion chamber to inject propellant from said reservoir to said combustion chamber;

said cut out portion and said enlarged portion being so sized and shaped to cooperate as said differential area piston moves with respect to said fixed member to define a variable area injection orifice between them for the flow of propellant from said reservoir to said combustion chamber.

4,586,423

CARTRIDGE BELT AND BELT LINKS THEREFOR

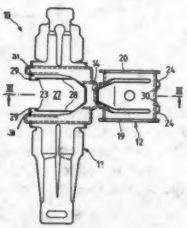
Werner Stauffacher, Effretikon, Switzerland, assignor to Werkzeugmaschinenfabrik, Oerlikon-Bührle AG, Zürich, Switzerland

Filed Jul. 18, 1983, Ser. No. 514,971

Claims priority, application Switzerland, Aug. 3, 1982, 4673/82

Int. Cl.⁴ F42B *39/08*

U.S. Cl. 89—35.02 **8 Claims**



1. A belt link for use with a cartridge belt composed of a plurality of adjacently interlinked ones of such belt links, each belt link comprising:

a clamp member having an inner substantially cylindrical surface;

stop means formed at said clamp member;

a link member connected with said clamp member and having an outer substantially cylindrical surface;

stop means formed at said link member;

said link member of one belt link and said clamp member of an adjacent belt link cooperating with one another in order to hold a cartridge;

said outer cylindrical surface of said link member of said one

belt link being pivotably guided at said inner cylindrical surface of said adjacent belt link when said belt links are assembled to form a cartridge belt and said cartridge belt is buckled about a lengthwise axis of said cartridge;

said stop means limiting the pivoting movement of said link member of said one belt link relative to said clamp member of said adjacent belt link when said belt links are assembled to form said cartridge belt;

said clamp member and said link member each have an outer end;

said outer end of said link member being located opposite said clamp member of said belt link and containing said stop means thereof and said outer end of said clamp member being located opposite said link member of said belt link and containing said stop means thereof in order to prevent said link member of said one belt link from being pivoted out from said clamp member of said adjacent belt link;

said clamp member being provided with a recess having edges which extend in a circumferential direction of the cartridge held in such clamp member;

said edges defining external end portions of the clamp member; and

said stop means defining cam means formed at said external end portions.

4,586,424

HYDRAULIC CONTROL ARRANGEMENT

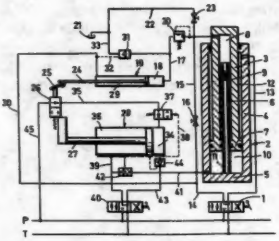
Ernst-Günter Nerlich, Essen, Fed. Rep. of Germany, assignor to Bochumer Eisenhütte Heintzmann GmbH & Co. KG, Bochum, Fed. Rep. of Germany

Filed May 24, 1983, Ser. No. 497,738

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1982, 3222051

Int. Cl.[4] F01B *25/02*

U.S. Cl. 91—6 **9 Claims**



1. A hydraulic control arrangement for providing synchronism of a return cylinder having a hollow piston rod and a bottom and arranged between a face conveyor and a support, with a pushing cylinder which displaces a leading cap of the support transverse to a face, the hydraulic arrangement comprising

a control valve;

a control cylinder controlling loading of the pushing cylinder via said control valve;

a connecting conduit between the return cylinder and said control cylinder and having a pressure limiting valve provided in said connecting conduit, said pressure limiting valve being adjustable above a setting pressure of the support and hydraulically controllable;

a control column provided between the return cylinder and said control cylinder and composed of a working fluid; and

a displacement pipe mounted on the bottom of the return cylinder, extending into the hollow piston rod and determining the volume of said control column, said displacement pipe being provided at its free end with a check valve.

4,586,425

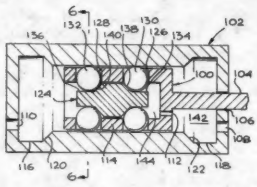
CLAMP LOCKING DEVICE

Paul G. Redman, and John M. Speicher, both of Upland, Calif., assignors to General Dynamics Pomona Division, Pomona, Calif.

Filed Jun. 9, 1980, Ser. No. 157,757

Int. Cl.[4] F15B *13/02*

U.S. Cl. 91—45 **13 Claims**



1. A clamping lock comprising:

a ring-shaped member having plural apertures on each lateral edge thereof and having a gap therein;

first lock positioning means on one side of said gap;

second lock positioning means on the other side of said gap;

a lock interconnecting said first and said second means comprising an external cylinder interconnected with the first lock positioning means and an external rod extending within the cylinder and connected to said second lock positioning means, said cylinder having internal annular lock receiving means;

an elongate piston positioned inside said cylinder and interconnected with the rod, the piston being hollow and having lock retaining orifices in an elongate portion thereof;

locking elements selectively engagable with said annular lock receiving means and positioned respectively in the orifices in the elongate portion of said piston; and

a free floating piston movable axially within the hollow elongate portion and having at least one section of larger diameter effective to lock the clamp by positioning the locking elements in the annular lock receiving means in said cylinder, and at least one section of reduced diameter effective to release the clamp by releasing the locking elements from the annular lock receiving means.

4,586,426

MULTI-CYLINDER PISTON ENGINE AND METHOD OF OPERATION THEREOF

Edwin W. Dibrell; Glenn B. O'Neal, and Wilbur A. Schaich, all of San Antonio, Tex., assignors to Centrifugal Piston Expander, Inc., San Antonio, Tex.

Filed Jun. 4, 1984, Ser. No. 617,288

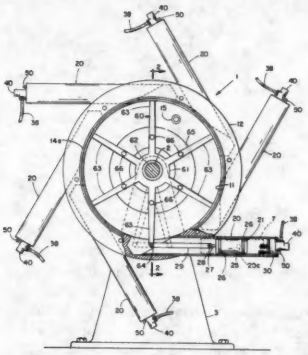
Int. Cl.[4] F01B *13/04;* F01L *23/00*

U.S. Cl. 91—176 **24 Claims**

1. Apparatus for producing oscillating movement of a power output shaft about its axis comprising, in combination, housing means connected to said shaft defining a generally cylindrical fluid pressure chamber about the shaft axis; a plurality of cylinders secured to said housing means in peripherally spaced relation, each said cylinder having an axis disposed in generally tangential relationship to said cylindrical fluid pressure chamber and an inner end in fluid communication with said fluid pressure chamber; a piston slidably and sealably mounted in each said cylinder for movement between an outer and an inner position relative to said fluid pressure chamber; a rocker element freely rotatable about said shaft axis; connecting rods respectively mounted between said rocker element and said pistons, whereby all said pistons move concurrently relative to said cylinders, input valve means in the outer end of each said cylinder responsive to movement of the respective piston to said outer position to open and close; means for supplying fluid pressure to said input valve means; exhaust valve means on the

outer end of each said cylinder responsive to movement of said piston to open and to close; and means for maintaining a fluid pressure in said fluid pressure chamber in excess of the minimum pressure operating on the outer faces of said pistons to return said pistons to said outer position, whereby said housing means and said output shaft are continuously oscillated about said shaft axis.

23. Valving apparatus for controlling the gas input to a cylinder having a piston reciprocably mounted therein, comprising a cylinder head sealably mounted on the outer end of said cylinder; said cylinder head defining a pressured gas inlet chamber; an axially extending inlet passage extending from said inlet chamber into the interior of said cylinder; an annular valve seat surrounding the outer end of said inlet passage; a



stem valve having a head portion sealingly engagable with said valve seat and a stem portion projecting into the interior of said cylinder; resilient means urging said stem valve into sealing engagement with said annular valve seat, whereby movement of said piston toward said cylinder head is required to engage said stem portion and move said head portion of said stem valve out of sealing engagement with said annular valve seat, thereby permitting flow of pressured gas into said cylinder; a second annular valve seat surrounding the inner end of said inlet passage; a spring biased check valve biased into engagement with said second annular valve seat whereby said inlet passage is opened only when said stem valve is shifted by said piston out of engagement with its said annular valve seat and the inlet chamber gas pressure exceeds the cylinder gas pressure.

4,586,427

VACUUM BRAKE BOOSTER

Rudolf Thiel, Frankfurt am Main, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Continuation of Ser. No. 395,874, Jul. 7, 1982, abandoned, which is a continuation of Ser. No. 143,382, Apr. 24, 1980, abandoned. This application Apr. 19, 1984, Ser. No. 601,125

Claims priority, application Fed. Rep. of Germany, May 10, 1979, 2918907

Int. Cl.⁴ F15B *9/10*

U.S. Cl. 91—369 A **12 Claims**

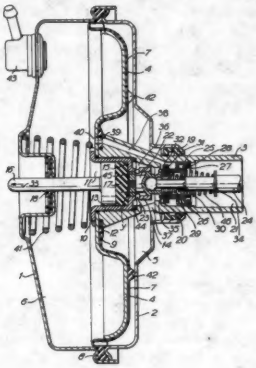
1. A vacuum brake booster comprising:

a housing having a longitudinal axis;

a movable rigid partition wall disposed in said housing coaxial of said axis to divide said housing into a working chamber and a vacuum chamber, said partition wall including a partition disposed in said vacuum chamber and a rubber diaphragm abutting said partition disposed in said working chamber;

a control hub containing a valve arrangement therein disposed in said housing coaxial of said axis, said control hub being axially movable in said housing and defining a bore therein coaxial of said axis opening into said vacuum chamber; and

a discrete sleeve fastened in said bore of said control hub in sealed relation internally thereof, said sleeve having a generally radially inwardly directed step at one end and slidingly supporting a force transmitting element and a reaction device therein coaxial of said axis with said reaction device disposed adjacent said step, said sleeve having an outwardly extending flange extending from an opposite



end thereof in said vacuum chamber, said flange being disposed to clamp an internal border of said partition wall between said flange and an end wall of said control hub with said flange disposed in said vacuum chamber in a sealed relationship with said partition wall and control hub such that movement of said partition acts on said sleeve and said force transmitting element via said reaction device whereby to substantially reduce forces acting on said control hub during operation of the brake booster.

4,586,428

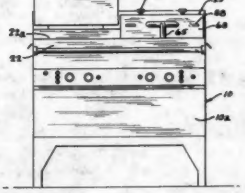
COOKING APPARATUS FOR TWO-SIDED COOKING

Lee E. Adamson, Roscoe, Ill., assignor to Special Equipment Companies, Inc., Taylor Freezer Division, Rockton, Ill.

Filed Aug. 22, 1985, Ser. No. 768,355

Int. Cl.⁴ A47J *27/62, 37/06*

U.S. Cl. 99—332 **10 Claims**



1. A cooking apparatus comprising, a support structure having a front and a rear, a lower cooking platen means fixedly mounted on the support structure and having an upper cooking surface, platen support arm means pivotally mounted on the support structure for movement about a horizontal pivot axis adjacent the rear of the structure between a lower cook posi-

tion extending generally horizontally above the lower cooking platen means and a raised position inclined upwardly from the lower cooking platen means, said support structure including a rigid member forwardly of the lower cooking platen means providing an upwardly facing arm stop abutment, arm stop means on the distal end of said platen support arm means engageable with said arm stop abutment on support structure for positively stopping downward movement of said platen support arm means at said lower cook, position, upper cooking platen means having a downwardly facing cooking surface, a plurality of spaced upright guide posts attached at their lower ends to the upper cooking platen means and extending upwardly therefrom, means on said platen support arm means guidably engaging said posts intermediate their ends and guiding said upper cooking platen means for limited floating movement relative to the platen support arm means in a direction perpendicular to the cooking surface on the upper cooking platen means, means attached to the posts defining downwardly facing platen abutment means spaced above the upper cooking platen means, a plurality of adjustable platen stop means mounted on the platen support means and engageable with the downwardly facing platen abutment means for limiting downward movement of the upper cooking platen means to a preselected lower position relative to the platen support arm means while allowing limited floating of the upper platen means upwardly from said preselected lower position, operating arm means rigidly connected to the platen support arm means, upper platen counterbalance means connected to said operating arm means for applying a yieldable counterbalance force sufficient to move the platen support arm means and the upper platen means from said lower to said raised position, operating arm abutment means on the operating arm means at a location spaced from said pivot axis and movable with the operating arm means in an arcuate abutment path as the platen support arm means is moved between its lower cook position and its raised position, pneumatic clamp cylinder means mounted on the support structure and having plunger means movable along a linear plunger path generally tangent to the arcuate abutment path and intersecting said arcuate abutment path at a location to engage said operating arm abutment means when the platen support arm means is in its lower cook position, means for actuating said clamp cylinder means to move the plunger means from a first position spaced from the arcuate abutment path to a second position engaging said operating arm abutment means and for deactuating said cylinder means to move the plunger means back to its first position, said pneumatic clamp cylinder means being operative when actuated to said second position to press the plunger means against the operating arm abutment means with force sufficient to overcome the counterbalance force and yieldably press the platen support arm means to its lower cook position with the arm stop means engaging the arm stop abutment.

4,586,429

FOOD DISPENSER

John Hawkins, Brookvale, Australia, assignor to Cubi Cubes Pty. Limited, Australia

PCT No. PCT/AU83/00193, § 371 Date Aug. 21, 1984, § 102(e) Date Aug. 21, 1984, PCT Pub. No. WO84/02457, PCT Pub. Date Jul. 5, 1984

PCT Filed Dec. 22, 1983, Ser. No. 648,156

Claims priority, application Australia, Dec. 24, 1982, PF7415

Int. Cl.[4] A47J *37/12*

U.S. Cl. 99—407 **11 Claims**

1. Apparatus for automatically cooking and dispensing food, the apparatus comprising:

a hopper for storing the food;

a food container having a base which is pivotable so as to be moveable between open and closed positions;

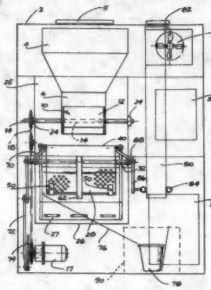
means for metering a predetermined amount of food through the hopper into the food container;

means for carrying and moving the food container between a first and a second position whilst maintaining the food container in a constant attitude;

a food cooker containing a fluid such as cooking oil, which cooker is disposed to receive the food container when the food container is in said first position;

dispensing means into which the food is deposited when the food container is disposed in said second position; and,

closing means for co-acting with the base of the food con-



tainer and to close the base when the food container is in said first position so that the food within the food container is retained therein whilst it is being cooked, the closing means comprising a resilient metal strip which is engaged by the base of the food container when the food container is in said first position, and the food container being disengaged from the closing means when in said second position so that food from the food container can be deposited into the dispensing means.

4,586,430

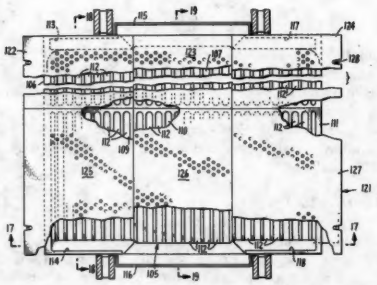
PRESS FOR EXTRACTING JUICE FROM COMESTIBLE SOLIDS AND SEMI-SOLIDS SUCH AS FRUIT AND VEGETABLES

Oldrich J. Tichy, Concord, and Konrad E. Meissner, Lafayette, both of Calif., assignors to Atlas Pacific Engineering Company, Emeryville, Calif.

Continuation-in-part of Ser. No. 514,099, Jul. 15, 1983, which is a continuation-in-part of Ser. No. 509,865, Jun. 30, 1983, abandoned. This application Oct. 19, 1984, Ser. No. 662,676

Int. Cl.[4] B30B *9/24, 9/26*

U.S. Cl. 100—118 **6 Claims**



1. In a press for extracting juice from comestible solids and semi-solids such as fruits and vegetables, a support structure comprising a support grid formed with a plurality of parallel troughs, a container, and a manifold for conveying extracted juices from one end of each trough to said container, said

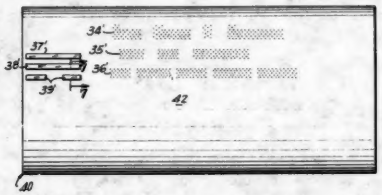
support grid being sectionalized and comprising left and right hand sections that cooperate to define a horizontal supporting surface interrupted by parallel troughs, each trough being open to the side of the horizontal supporting surface and closed at the opposite end, the left hand sections discharging juices to the left side of the horizontal supporting surface and the right hand sections discharging juices to the right side of the horizontal supporting surface.

4,586,431

METHOD OF SIMULATED ENGRAVED PRINTING

Donald R. Calman, 18 Anchor Dr., Rye, N.Y. 10580

Filed Jun. 15, 1984, Ser. No. 621,096
Int. Cl.[4] B31F *1/07*
U.S. Cl. 101—32 **12 Claims**



1. A method for simulating engraved printing on a print media comprising the steps:

a. printing at least one character with ink on a first side of said print media, said at least one character being in at least one group forming at least one word, and said characters being arranged in at least one line of print;

b. elevating portions of a first surface of a die in at least one pattern corresponding in size and shape of its peripheral outline to the peripheral outline of said at least one group taken as an entity, said at least one pattern being one of a group consisting of a solid bar and a matrix of a plurality of protrusions extending from said first surface, said protrusions being shaped and distributed within said pattern without regard to actual shape of any one of said at least one character within said at least one group;

c. positioning momentarily said ink-printed media between said first surface and a second surface, said second surface having resilience, said at least one printed group of characters facing said second surface;

d. registering at least momentarily each said ink printed group with the corresponding elevated pattern on said second surface;

e. pressing said first and second surfaces together causing said elevated patterns in said print media to press into said second surface during said registry with said corresponding printed groups;

f. separating said registered groups of characters and patterns on said first surface and print media, respectively.

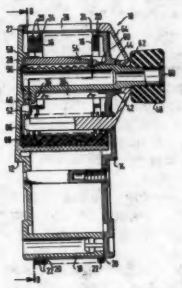
4,586,432

SETTING MEANS FOR PRINTER WITH PLURAL ENDLESS BANDS

Heinrich Volk, Beerfelden, Fed. Rep. of Germany, assignor to Esselte Pendaflex Corporation, Garden City, N.Y.

Filed Feb. 21, 1985, Ser. No. 704,079
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1984, 3406791
Int. Cl.[4] B41J *1/20*
U.S. Cl. 101—111 **4 Claims**

1. Printing mechanism comprising a sleeve including an axially immovable detent element and a plurality of setting wheels each having a hub with a plurality of radial recesses and mounted coaxially on said sleeve, and type carriers carrying printing types in a drive connection with said setting wheels, a setting shaft disposed rotatably and axially displaceably in the sleeve, a slot extending in the axial direction formed in the sleeve, and a tooth on the setting shaft extending through said slot and engaging said radial recesses, and a detent means with detent recesses on the peripheral surface of the setting shaft into which, for fixing axial detent positions of the setting shaft,



said axially immovable detent element engages, said detent recesses (**56;104,106**) being arranged in a plurality of axial rows with each row having a different detent spacing, said detent element (**54**) being movable into any detent recess in one of said rows.

4,586,433

OVER THE EDGE PRINTING APPARATUS WITH CLEANER

David Jaffa, and Sandor Szarka, both of Franklin Lakes, N.J., assignors to Precision Screen Machines, Inc., Hawthorne, N.J.

Division of Ser. No. 207,884, Dec. 20, 1980, Pat. No. 4,389,936.
This application Jun. 24, 1983, Ser. No. 507,526
Int. Cl.[4] B41L *41/00, 13/18*
U.S. Cl. 101—123 **6 Claims**

1. Apparatus for printing upon the edge of a workpiece and which is capable of a printing stroke and a non-printing stroke, said apparatus including

a support frame,

a printing screen mounted on said support frame and having an upper and a lower surface,

said printing screen having selected open portions for permitting passage of ink through said printing screen and having selected blocked portions for preventing passage of ink through said printing screen,

said open portions of said screen being positioned upon at least a portion of said workpiece,

ink deposition means mounted on said support frame operatively disposed to deposit ink on said upper surface of said printing screen, and

printing squeegee means movably mounted on said support frame for forcing said ink through said open portions of said printing screen onto said workpiece during said printing stroke of said apparatus,

said selected open portions of said printing screen being disposed to extend beyond at least one edge of said workpiece,

cleaning means mounted on said support frame and disposed to clean ink which is collected on said lower surface of said printing screen during said printing stroke of said

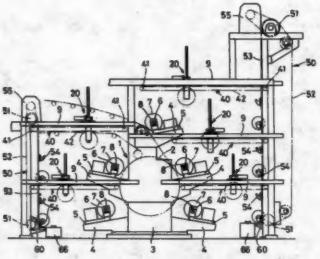
apparatus during said non-printing stroke of said apparatus, and
drive means for said ink deposition means,
said ink printing squeegee means,
said cleaning means, and
timing and control means connected to said drive means for operation of said apparatus in a repeated sequential series of operations comprising
deposition of ink,
the printing stroke, and
the non-printing stroke, wherein said non-printing stroke and said deposition of ink occur simultaneously.
transfer means operatively arranged and disposed to transfer and position said workpiece below said printing screen prior to said printing stroke and to remove said workpiece from below said printing screen prior to said non-printing stroke,
wherein said cleaning means comprises:
a take-up roller mounted on said support frame,
support carriage means movably mounted on said support frame,
a pressure roller rotationally mounted on said support carriage and disposed below and proximate to said printing screen,
a cleaning belt passing over said pressure roller and disposed between said pressure roller and said lower surface of said printing screen while being partially rolled onto said take-up roller,
excess ink squeegee means movably mounted on said support frame and disposed above said printing screen,
control means operatively disposed to move said support carriage and said pressure roller to permit of unrolling said cleaning belt from said take-up roller at the start of said non-printing stroke and for causing said excess ink squeegee to bear against the upper surface of said printing screen to thereby cause said lower surface of said printing screen to bear against said cleaning belt, and
said control means also being operative to cause said excess ink squeegee and said pressure roller to move in timed relationship across said printing screen and to concommitantly cause said take-up roller to reroll said cleaning belt.

4,586,434

DEVICE FOR REPLACING PLATE CYLINDERS

Masateru Tokuno, Nishinomiya; Tetsuya Sawada, Nishigyo; Hidetoshi Hoshiyama, Ibaraki, and Toshihiro Yoneda, Takatsuki, all of Japan, assignors to Rengo Co., Ltd., Osaka, Japan

Filed May 1, 1985, Ser. No. 729,348
Claims priority, application Japan, May 17, 1984, 59-100860
Int. Cl.[4] B41F *13/00*
U.S. Cl. 101—178 **4 Claims**



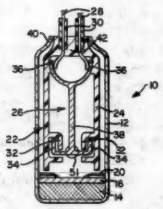
1. A device for replacing plate cylinders for a color printer having a plurality of plate cylinders, said device comprising:
a plurality of pairs of suspending means having a bearing adapted to support one end of the shaft of the plate cylinder and to be movable in a vertical direction for suspending the plate cylinder;
a plurality of pairs of travelling means for moving the plate cylinder supported on said suspending means in a horizontal direction; and
at least one pair of elevator conveyors having a conveyor body movable up and down and a plurality of bearings secured to said conveyor body for supporting each end of the shaft of the plate cylinder;
the bearings of said suspending means and the bearings of said elevator conveyors being arranged so that the plate cylinder on the bearings of said suspending means will be received by the bearings of said elevator conveyors either by moving the bearings of said suspending means downwardly past the bearings of said elevator conveyor or moving the latter upwardly past the former and so that the plate cylinder on the bearings of said elevator conveyor will be received by the bearings of said suspending means either by moving the bearings of said elevator conveyor downwardly past the bearings of said suspending means or moving the latter upwardly past the former.

4,586,435

ELECTRIC DETONATOR

Immo E. Bock, Randburg, South Africa, assignor to Johannesburg Construction Corporation (PTY) Ltd., Johannesburg, South Africa

Filed May 1, 1984, Ser. No. 605,943
Claims priority, application South Africa, May 3, 1983, 83/3118; Jul. 26, 1983, 83/5437; Aug. 2, 1983, 83/5631
Int. Cl.[4] F42C *19/12*; F42B *3/12*
U.S. Cl. 102—202.5 **56 Claims**



1. An electric detonator which includes
a fuse element which is of a combustible material, is elongate and has an ignition portion, a delay portion, and a fuse portion;
a heat sensitive ignition charge which is responsive to the fuse element and is adjacent the fuse portion; and
a base charge.

4,586,436

ELECTRONIC ASSEMBLY FOR MODERATE HARD TARGET PENETRATOR FUZE

James R. Denney, and Robert L. Stehr, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 13, 1984, Ser. No. 650,032
Int. Cl.[4] F42C *11/00*
U.S. Cl. 102—206 **21 Claims**

1. A microcomputer controlled electronic assembly for a target penetrator bomb fuze capable of withstanding a 100,000 g impact and of interfacing with a plurality of components including,
a fuze contact, proximity, and drag sensor,
a fuze mechanical timing and alignment device,
a fire pulse delay switch and arming time switch,
a Fuze Function Control Set (FFCS) and an alternate FFCS,
a wind turbine generator, and
a fire pulse generator,

comprising:

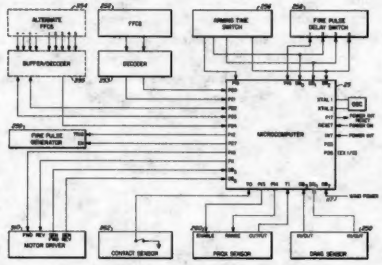
a power conversion circuit coupling said wind turbine generator to said mechanical timing and alignment device and to said microcomputer;

a detonation delay code storage circuit, coupling said FFCS to said microcomputer;

means for coupling said alternate FFCS to said microcomputer;

a sensor lead coupling said contact, proximity, and drag sensors to said microcomputer;

a switch lead coupling said arming time switch and said fire pulse delay switch to said microcomputer;



a motor drive circuit coupling said mechanical timing and alignment device to said microcomputer;

a power storage circuit, keep alive circuit, capable of withstanding a 100,000 g impact, coupling said wind turbine generator to said microcomputer;

a timing circuit, capable of withstanding a 100,000 g impact, coupled to said microcomputer; and

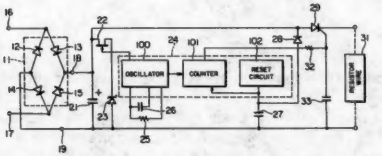
a fire pulse circuit, capable of withstanding a 100,000 g impact, coupling said fire pulse generator to said microcomputer.

4,586,437

ELECTRONIC DELAY DETONATOR

Kosuke Miki, Sagamihara, and Shiro Hiruta, Tokyo, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Japan

Filed Apr. 18, 1984, Ser. No. 601,699
Int. Cl.[4] F42C *11/06*
U.S. Cl. 102—220 **12 Claims**



1. An electronic delay detonator for driving an ignition device with a predetermined time delay by being supplied with electrical energy, comprising:

input terminal means for supplying the electrical energy to said delay detonator;

a first capacitor for storing said electrical energy;

means inserted between said input terminal means and said first capacitor for preventing said stored electrical energy from being released through said input terminal means;

oscillator means electrically connected to said first capacitor and including a resistor and a second capacitor, for producing a plurality of pulse signals of a period proportional to the product of the resistance value of said resistor and the capacitance value of said second capacitor. said oscillator means also including a C-MOS integrated circuit;

means connected across said first capacitor for generating a constant voltage, said constant voltage generating means including a series connection of a diode-connected junction-type field effect transistor and a zener diode, said C-MOS integrated circuit being operated by said constant voltage generated across said zener diode;

means for counting said plurality of pulse signals and for producing a first signal upon counting said pulse signals up to a number corresponding to said predetermined delay time; and

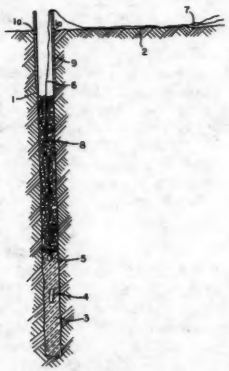
means responsive to said first signal for supplying the electrical energy stored in said first capacitor to said ignition device.

4,586,438

BOREHOLE STEMMING WITH A COLUMN OF LIQUEFIABLE AND/OR VAPORIZABLE CHUNKS OF SOLID MATERIAL

David L. Coursen, Wilmington, Del., and James D. Heffner, Aiken, S.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 551,473, Nov. 14, 1983, abandoned. This application Sep. 20, 1984, Ser. No. 652,268
Int. Cl.[4] F42B *3/00*
U.S. Cl. 102—313 **27 Claims**



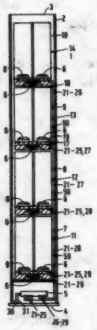
1. In a method of stemming a hole in a subsurface formation at a substantially liquid-free location between the collar of the hole and the top of an explosive charge therein so as to confine the gases produced when said charge is initiated after the hole has been stemmed, the improvement comprising delivering into said hole, at said location, chunks of at least one readily liquefiable and/or vaporizable material, and allowing said chunks to pile up one upon the other and form a columnar bed of pre-solidified material, said solid material having a melting or sublimation temperature at one atmosphere pressure that is (a) sufficiently high that the column of chunks remains in place until, while, and for a period of time after, said charge explodes, and (b) sufficiently low that, after the explosion, said column melts and/or sublimes on standing.

4,586,439

CARTRIDGE FOR LAUNCHING DECOYS

Josef B. V. Wrana, Spånga, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 30, 1984, Ser. No. 605,533
Claims priority, application Sweden, May 3, 1983, 8302510; Apr. 16, 1984, 8402109
Int. Cl.[4] F42B *13/00, 13/50*
U.S. Cl. 102—438 4 Claims



1. A cartridge for launching decoy material, said cartridge comprising:

(a) a tubular envelope having a launching end from which the decoy material is to be ejected;

(b) a plurality of tubular cassettes longitudinally-arranged in the envelope, each cassette having a launching end from which decoy payloads are to be ejected;

(c) a first plurality of electrically-triggered igniters, each disposed at an end of a respective one of the cassettes remote from the launching end of the envelope for effecting ejection of the cassette from the envelope;

(d) a plurality of the decoy payloads, arranged transversely with respect to each other, in each cassette;

(e) a second plurality of electrically-triggered igniters, each disposed at an end of a respective one of the payloads remote from the launching end of its respective cassette for effecting ejection of the payload from the cassette; and

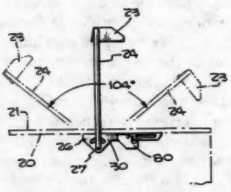
(f) an electronic signal ignition device electrically-connected to the igniters, said device including means for selectively triggering the igniters and thereby selectively ejecting the respective payload or cassette associated with any triggered igniter.

4,586,440

CONTROLLED MOUNTING FOR LUMINAIRE ON TILTABLE DRAFTING BOARD

Frank S. Avella, Irvine, Calif., assignor to Plan Hold Corporation, Irvine, Calif.

Filed Jan. 15, 1985, Ser. No. 692,014
Int. Cl.[4] A47B *85/00*
U.S. Cl. 108—23 15 Claims



1. In an apparatus for illuminating a work surface on a drafting board or the like which is adapted to be inclined between horizontal and approximately vertical positions, the combination of:

bracket members carried on opposite sides of a drafting board;

a luminaire support member extending above and across said work surface and pivotally mounted from said bracket members;

and means on each of said bracket members for controlling pivotal movement of the luminaire support member relative to the work surface at inclined positions of the drafting board between the horizontal and vertical positions;

said controlling means including

a crank means at the pivotal mounting of said luminaire support member and connected therewith, and

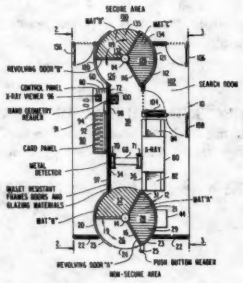
first and second control means cooperable with said crank means and moveable along paths provided by said bracket means for counterbalancing and maintaining a selected position of the luminaire support member.

4,586,441

SECURITY SYSTEM FOR SELECTIVELY ALLOWING PASSAGE FROM A NON-SECURE REGION TO A SECURE REGION

Michael B. Zekich, Pasadena, Calif., assignor to Related Energy & Security Systems, Inc., Evansville, Ind.

Filed Jun. 8, 1982, Ser. No. 386,291
Int. Cl.[4] E05G *3/00*
U.S. Cl. 109—8 19 Claims



1. A security system for selectively allowing passage of an individual from a non-secure region to a secure region, comprising:

first revolving door means for selectively allowing passage of a person from the non-secure region to a mid-zone;

second revolving door means spaced apart from the first revolving door means for selectively allowing passage to a secure region;

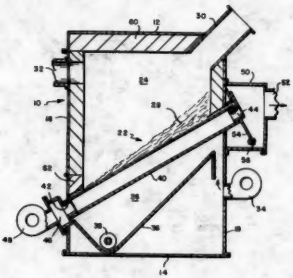
mid-zone means for securely retaining and observing a person passed from the first revolving door means, the mid-zone means disposed between the first and second revolving door means; means for observing individuals in the mid-zone means, and a control panel physically separated from the mid-zone means, the control panel comprising an X-ray monitor for remotely viewing objects passed across the X-ray detection system in the mid-zone means; said control panel comprising a card panel and means for transferring cards from the card panel between the control panel and the mid-zone means.

4,586,442

GASIFIER METHOD AND APPARATUS

Robert A. Caughey, Antrim, N.H., assignor to New Hampshire Flakeboard, Antrim, N.H.

Filed Jun. 25, 1984, Ser. No. 624,403
Int. Cl.[4] F23G *5/12*
U.S. Cl. 110—229 **15 Claims**



1. Gas generator apparatus for generating combustible gas by pyrolysis of biomass material, said generator apparatus comprising, in combination

an enclosed chamber,

a plurality of parallel, uniformly inclined and axially-extending support tubes, each of which has a hollow interior axial passage connecting a lower inlet end and an upper outlet end, said support tubes dividing said chamber to form a single gas-generating first chamber region situated above said tubes and a plenum second chamber region below said tubes, said tubes being adapted for oscillation about the axis thereof in a common direction to facilitate the delivery of ash and unburned biomass into the second chamber region,

means for introducing biomass material into said first chamber region onto the upper ends of said tubes,

means for introducing primary air into said second chamber region for flowing upwardly between said tubes for pyrolysis of said biomass material,

means for introducing cooling air into the passages of said tubes at the lower inlet ends thereof for cooling said tubes, said cooling air becoming heated by a heat exchange process as it cools said tubes, and said air being vented from the upper ends thereof,

means for exhausting from said frist chamber region combustible gas generated by the pyrolysis of said biomass,

means for removing ash and unburned biomass from the first chamber region at the lower ends of said tubes, and

screw discharge means for removing ash and unburned biomass from said second chamber region.

4,586,443

METHOD AND APPARATUS FOR IN-FLIGHT COMBUSTION OF CARBONACEOUS FUELS

Harland L. Burge, Garden Grove, and John A. Hardgrove, Rolling Hills Estates, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

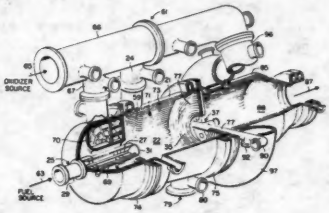
Continuation of Ser. No. 670,441, Nov. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 556,738, Nov. 30, 1983, abandoned, which is a continuation of Ser. No. 400,789, Jul. 22, 1982, abandoned, which is a continuation of Ser. No. 088,810, Oct. 29, 1979, abandoned, which is a division of Ser. No. 837,234, Sep. 27, 1977, Pat. No. 4,217,132. This application Aug. 21, 1985, Ser. No. 768,094
Int. Cl.[4] F23D *1/00*
U.S. Cl. 110—347 **22 Claims**

1. The method of combusting pulverized solid carbonaceous fuel comprising the steps of:

(a) introducing such fuel into a combustion chamber near the center of one end thereof;

(b) directing at least one stream of oxidizer into said chamber in a manner to provide high velocity rotational flow within said chamber; and

(c) regulating the velocities and relative mass flow rates of said fuel and said oxidizer to (1) keep combustion temperatures within a range such that liquid slag is substantially



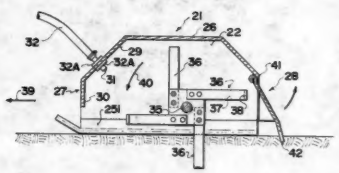
continuously deposited on an inner surface of the chamber and may be removed therefrom separately from gaseous products of combustion, (2) convert most of the carbon content of the fuel particles to oxides of carbon before the particles impinge on the inner walls of the chamber, and (3) maintain a fuel-rich combustion mixture in at least a substantial portion of the combustion zone within said chamber to thereby limit the formation of oxides of nitrogen and/or sulfur.

4,586,444

LIQUID CHEMICAL INCORPORATOR ASSEMBLY

Cornelius Thiessen, Box 92, Miami, Manitoba, Canada (R0G 1H0)

Filed May 7, 1984, Ser. No. 607,936
Int. Cl.[4] A01C *23/02*
U.S. Cl. 111—6 **4 Claims**



1. An agricultural implement for seeding and incorporating chemical in bands spaced laterally of a working direction and movement of the implement, the implement including a frame, a plurality of seeder units mounted on the frame spaced laterally thereof, a plurality of liquid chemical incorporating assemblies each associated with and aligned forwardly relative to a respective one of the seeder units and each comprising an enclosed casing having an open base, means to convey liquid chemical to the casing, nozzle means arranged to spray said liquid chemical on the ground within the casing and soil breaking teeth mounted on an axle fixed to the casing for rotation about a substantially horizontal axis within the casing, the soil breaking teeth including a portion extending radially from said axle and a portion bent relative thereto so as to lie substantially parallel to the axle and radially spaced therefrom, a power source on the frame, flexible coupling means for coupling power from said power source to each of said casings for driving the teeth therein, toothed raking means pivotally mounted on a rear portion of said casing for pivotal movement about a horizontal axis transverse to said casing for smoothing the soil behind said incorporating assembly and means mounting the casing on the frame for floating movement relative to

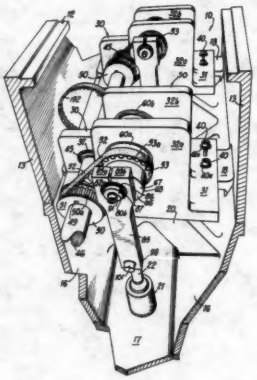
the ground with the open base exposed to the ground, said mounting means comprising strut means extending forwardly and upwardly from the casing to the frame, said strut means being coupled to the frame for pivotal movement thereto so as to allow upward floating movement of the casing relative to the ground, the direction of rotation of said teeth being arranged so as to drive the casing forwardly whereby a reaction from said upwardly and forwardly extending means provides a component of force downwardly on the casing to force said casing against the ground, and a pair of horizontal skids mounted on said casing at lower side edges thereof for running along the ground in contact therewith.

4,586,445

HIGH SPEED TUFTING MACHINE

Roy T. Card, and Joseph L. Card, both of Chattanooga, Tenn., assignors to Card-Monroe Corporation, Chattanooga, Tenn.

Filed Sep. 30, 1985, Ser. No. 781,673
Int. Cl.[4] D05C *15/00*
U.S. Cl. 112—79 R **18 Claims**



1. A tufting machine of the type having a frame provided with a head, a plurality of spaced slideable push rods extending through said head along spaced parallel axes and a needle bar carried by the ends of said push rods externally of said head, the improvement comprising:

(a) a main drive shaft rotatably disposed in said head;

(b) a plurality of individual drive trains in said head, said drive trains respectively including drive wheels at spaced positions on said main drive shaft for rotation therewith;

(c) said drive trains also respectively including rotatable driven wheels disposed in said head and respectively driven from said drive wheels;

(d) crank members respectively rotated by said driven wheels when said driven wheels are rotated;

(e) connecting rod drive means respectively on said crank members; and

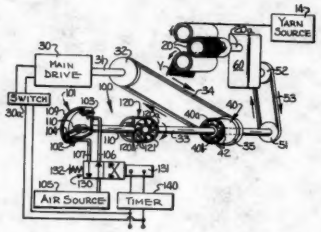
(f) connecting rods respectively pivotally connected to said connecting rod drive means and respectively connected to the other end portions of said push rods for reciprocating all of said push rods simultaneously, to reciprocate said needle bar when said crank members are rotated.

4,586,446

APPARATUS AND METHOD FOR ELIMINATING STOP MARKS IN CARPETS ON TUFTING MACHINES

James J. Cooper, Ellijay, Ga., assignor to Collins & Aikman Corporation, New York, N.Y.

Filed Sep. 12, 1985, Ser. No. 775,497
Int. Cl.[4] D05C *15/00*
U.S. Cl. 112—79 R **10 Claims**



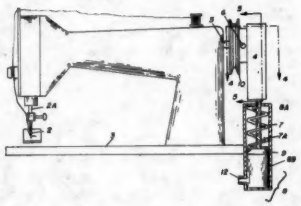
1. In a tufting machine having tufting needles and loopers cooperating with said needles to engage loops of tufting yarn presented thereto, means for feeding a backing fabric to the tufting needles for the formation of tufts therein, and yarn feed rolls for positively feeding the tufting yarns from a source forwardly toward the tufting needles, and means including a main drive shaft for coordinated driving of said needles, loopers, feeding means for said backing fabric, and yarn feed rolls so as to form successive rows of pile tufts in the backing fabric, the combination therewith of means for preventing the formation of stop marks in the tufted fabric, as exhibited by a row of tufts of shorter height being formed when the tufting machine is stopped, said last recited means comprising auxiliary drive means connected to said yarn feed rolls for feeding the tufting yarns forwardly a predetermined amount in response to stoppage of the main drive shaft.

4,586,447

SEWING MACHINE NEEDLE POSITIONER

Michael Tuskos, 5719 W. Highway 22, Crestwood, Ky. 40014

Continuation-in-part of Ser. No. 337,619, Jan. 7, 1982, abandoned. This application Feb. 22, 1984, Ser. No. 582,313
Int. Cl.[4] D05B *69/22*
U.S. Cl. 112—274 **6 Claims**



1. A device for use with a sewing machine to position the sewing machine needle to selected location with respect to a work surface where the sewing machine includes a rotatable drive shaft for the stitching mechanism including a clutch means attached to the drive shaft to rotate the drive shaft when the clutch is rotated in a first direction where the clutch includes a stop to engage pressure plate means when the clutch has rotated in the first direction to a selected point where the needle is in selected location with respect to said work surface where the pressure plate is carried by a gear rack assembly which moves bidirectionally along a selected axis and includes

a gear rack to engage a gear carried by the clutch to rotate said clutch and drive shaft in the first direction when the gear rack moves in a first direction until the stop engages the pressure plate to stop the gear rack assembly and rotates the clutch in a second direction when the gear rack moves in the second direction to release the stop from the pressure plate.

4,586,448

SEWING MACHINE

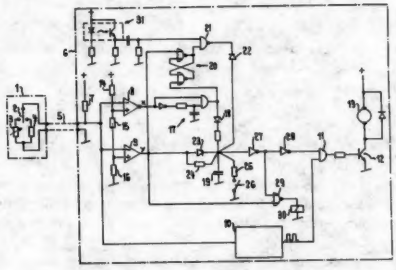
Hansueli Lerch, and Otmar Stillhard, both of Steckborn, Switzerland, assignors to Fritz Gegauf AG Bernina-Nahmaschinenfabrik, Steckborn, Switzerland

Filed Oct. 25, 1983, Ser. No. 545,186

Claims priority, application Switzerland, Nov. 24, 1982, 6844/82

Int. Cl.⁴ D05B *69/22*

U.S. Cl. 112—275 **22 Claims**



1. A sewing machine having an electric driving motor, a needle and a foot control for regulating sewing speed and for selecting at least one needle stop position, said foot control having a range of regulation for which a regulating signal for determining the sewing speed is produced and an off position for which a switch off signal, different from the regulating signal, is produced, a receiver for receiving the regulating signal and switch off signal, said receiver being operable upon receipt of said switch off signal, to control the needle in said at least one needle stop position, said foot control having at least one control position for producing a control signal different from the regulating signal and the switch off signal, said foot control comprising a change over switch commutable between end positions for producing output signals, corresponding to the control signal and the regulating signal, to the receiver, said control signal having a voltage range outside a voltage range of the regulating signal, the receiver comprising logic circuits with at least two comparator circuits each having different actuation levels for producing a combination of logic signals corresponding to the received signals, said combination of logic signals defining at least three predetermined logic conditions, each of said logic conditions determining a function, and a two wire connection for transmitting signals between the foot control and the receiver.

4,586,449

THREAD CUTTING DEVICES FOR DOUBLE LOCKSTITCH SEWING MACHINES

Günter Raupach, Bielefeld, Fed. Rep. of Germany, assignor to Kochs Adler AG, Fed. Rep. of Germany

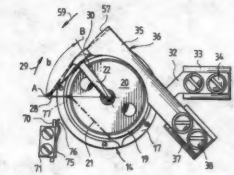
Filed Jan. 16, 1984, Ser. No. 570,865

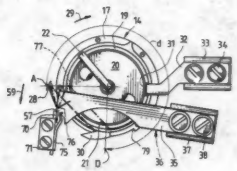
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1983, 3303032

Int. Cl.⁴ D05B *65/00*

U.S. Cl. 112—292 **6 Claims**

1. A thread cutting device for a double lockstitch sewing machine with a needle adapted to pass into a stitch hole, with a rotatably driven hook with a hook beak for catching a needle thread loop, with a rotation axis parallel to the needle and with a bobbin case mounted in the hook in a non-rotary manner with respect to the sewing machine and from which a bobbin thread is fed to the stitch hole and with a thread catcher with a cutting edge which can be moved between the hook and the stitch hole and which cooperates with a substantially fixed counterknife, the thread catcher being movable from a basic position of rest towards said counterknife and having a cutout for catching the bobbin thread and the workpieceside portion of the needle thread and a leg with a point advancing in a direction of movement when catching said threads and which can be moved between the needle-side portion of the needle thread on the one hand and its workpiece-side portion and the bobbin thread on the other hand, in which said direction of movement of the thread catcher when catching said threads is opposite to the direction of rotation of said hook and in which said thread catcher is operable from its basic position of rest towards the counterknife when the hook beak is in a range of up to 90° from the stitch hole in the direction of rotation of said hook.





4,586,450

SAFETY DEVICE FOR FASTENING THE HEAD OF A SAIL TO A MASTHEAD

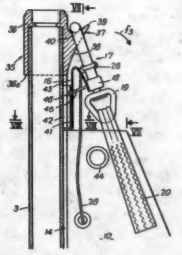
Bernard Bernard, Lyons, France, assignor to Societe Anonyme: Leisystem, France

Filed Oct. 24, 1984, Ser. No. 664,215

Claims priority, application France, Oct. 28, 1983, 83 17508

Int. Cl.⁴ B63H *9/04*

U.S. Cl. 114—108 **7 Claims**



1. A safety device for the quick connection and disconnection of the head of a sail having a luff rope with respect to a masthead carried by a mast, which device comprises:

(a) a snap shackle defined by a body disposed within a plane, a swivel carried at one end of the body for attachment to the head of the sail, a fixed arm defining a laterally offset fork with respect to the axis of the swivel carried at the other end of the body, the body defining a fastening projection, a catch supported by the body in relation to the projection, the catch including a releasing means attached thereto, and a movable arm supported by the fork, the movable arm including a free end configured for complementary engagement with the fastening projection;

(b) the mast including a plurality of longitudinal luff grooves;

(c) the head of the mast including a projection extending radially in the same general direction as that of the luff grooves for engagement by the snap shackle, a portion of the projection defining an inclined ramp;

(d) a slide block slidably supported in at least one luff groove of the mast; and

(e) an elastically deformable connecting member interposed between the slide block and the body for securing the body in a position wherein its plane is disposed both perpendicular to the plane of the sail and inclined towards the head of the mast.

4,586,451

SURFBOARD PROTECTOR

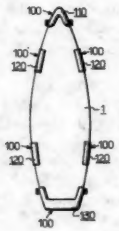
Kozo Mori, Tokyo, Japan, assignor to International Harvest Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1984, Ser. No. 629,501

Claims priority, application Japan, Jul. 13, 1983, 58-107634[U]

Int. Cl.⁴ B63B *59/02*

U.S. Cl. 114—219 **1 Claim**



1. A protector for preventing damage to a surfboard, comprising:

a plurality of separate partial covers being spaced along a perimeter of the surfboard and each of the separate partial covers being provided with an opening therein;

said plurality of separate partial covers being made of flexible material and having each of the openings forcibly form-fitted manually and nonadhesively over a nose, and a tail on the perimeter of the surfboard;

each of said separate partial covers forcibly form-fitted to the nose and the tail having a concavity which forms wing means for easily opening widely the separate partial covers for the nose and the tail so that said nose and said tail may be easily inserted into each of the openings therefor; and

belt holders being integrally fixed near ends of the wing means for the nose and the tail and having belt holes therein.

4,586,452

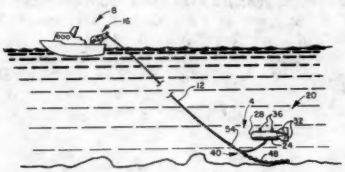
UNDERWATER TOW SYSTEM AND METHOD

Robert A. Lapetina, Salt Lake City, Utah, and Edward C. Brainard, II, Marion, Mass., assignors to Edo Western Corporation, Salt Lake City, Utah

Continuation of Ser. No. 288,947, Jul. 31, 1981, abandoned. This application Jun. 28, 1984, Ser. No. 614,113

Int. Cl.⁴ B63G *8/14*

U.S. Cl. 114—245 **6 Claims**



5. A tow system for towing objects underwater by tow cable behind a vessel, said system including

a buoyant tow vehicle,

means coupling the tow vehicle to an end of the cable, said coupling means including a cable length, one end of which is coupled to the tow vehicle, and the other end of which is swivelably coupled to the tow cable,

weight means attached to the cable length at a location spaced some distance from the tow vehicle for pulling the two cable downwardly in the water until the weight means contacts the water floor, and

a fair lead assembly for connecting the weight means to the cable length, said fair lead assembly comprising

a saddle for fitting over the cable length, said saddle having a curved channel into which the cable length is fitted and a pair of skirts extending from the channel on either side of the cable in a generally parallel relationship,

a clamp for clamping the saddle to the cable length, and means for connecting the weight means to the skirts.

4,586,453

LAUNCHING APPARATUS FOR BOATS

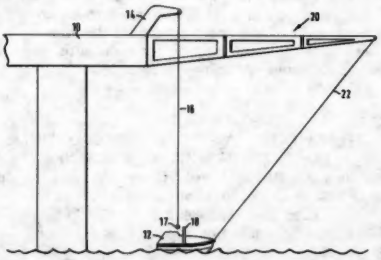
Thomas M. Wilks, Cowes, and Simon P. K. Pope, Romsey, both of England, assignors to Watercraft Limited, Gosport, England

Filed Jun. 18, 1984, Ser. No. 621,742

Claims priority, application United Kingdom, Jun. 21, 1983, 8316876

Int. Cl.⁴ B63B *23/02*

U.S. Cl. 114—368 **3 Claims**



1. Launching apparatus that permits a small boat carried by a vessel to be launched positively away therefrom in a bows-out attitude, including:

a boom mounted on the vessel that deploys outwardly from

the vessel as the boat is lowered and when deployed extends substantially beyond the boat to be launched;

at least one fall by which the boat is lowered;

a bow-line carried by the boom and releasably attached to the boat;

means maintaining said bow-line under tension during boat descent and after the boat has reached the water so that said bow-line holds the boat in a bows-out heading and exerts a towing load thereon that after release of the fall accelerates said boat away from the vessel until it has passed the end of said boom;

wherein pivot means pivot the boom to the vessel for rotation about a horizontal axis, and biasing means connected between the vessel and the boom urges the boom towards a raised neutral position so that during launch of the boat the boom is pulled below its neutral position and the return action of the biasing means provides towing load to the bow-line.

4,586,454

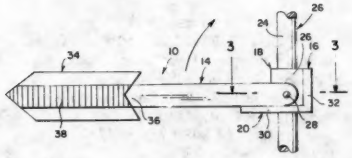
DISTANCE STICK

Ace H. Hedquist, and George Spector, both of 233 Broadway, Rm. 3615, New York, N.Y. 10007

Filed Jul. 26, 1984, Ser. No. 634,815

Int. Cl.⁴ B60Q *11/00*

U.S. Cl. 116—28 R **4 Claims**



1. A distance safety stick for a bicycle and the like comprising a guard arm and a mounting device affixed to the frame of said bicycle for pivotally supporting said guard arm in a horizontally disposed position at one side of said bicycle, said guard arm being adapted to pivot upwardly into a vertically retracted position, said mounting device including a C-shaped clamp holder adjustably mounted on an upwardly extending portion of said frame of said bicycle and an L-shaped bracket member integrally formed with said clamp holder for supporting said guard arm in said positions, said clamp holder having a set screw for engaging said upwardly extending bicycle frame portion at various selected locations, said L-shaped bracket member being constructed to extend transversely from a rear wall of said clamp holder, said rear wall of said clamp holder having a pivot element located transversely therethrough for pivotally supporting said guard arm, a horizontal portion of said L-shaped bracket member supporting said guard arm in said horizontally disposed position while a vertical portion of said L-shaped bracket member supports said guard arm in said vertically retracted position.

4,586,455

LID KNOB OF PRESSURE COOKER

Yoshikazu Shibata, Tokyo, Japan, assignor to Japan Life Co., Ltd., Tokyo, Japan

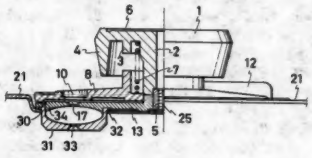
Continuation-in-part of Ser. No. 570,242, Jan. 12, 1984, Pat. No. 4,548,156. This application Sep. 27, 1984, Ser. No. 655,095

Int. Cl.⁴ G08B *3/00*; **A47J** *27/36.06, 27/56*

U.S. Cl. 116—67 R **4 Claims**

1. A lid knob for a pressure cooker, comprising a thumb which is composed of a middle shaft secured to a female tube, a middle wall, said middle shaft and said middle wall defining a space holding a spring, and a skirt defining an outer circumference of said thumb; a dish-shaped stand which is centrally provided with a sleeve for receiving the middle shaft and the spring, said stand defining a hole in a circumferential portion thereof, said stand having a downwardly extending stopper; a guide plate which is centrally provided with a sleeve for receiving an exposed portion of the female tube and which also defines a guide hole for the stopper;

a lid defining a hole in a circumferential portion thereof, said guide plate having a whistling depression on a reverse side of a circumferential portion thereof adapted to align and



communicate with said hole in said lid; said guide plate being open centrally of the whistling depression to form a steam hole adapted to align and communicate with said hole in said stand; a whistling valve for fitting in said hole in said lid, said whistling valve defining a steam hole centrally located therein, said steam hole in said whistling valve being adapted to align and communicate with said hole in said stand and said steam hole in said guide plate.

4,586,456

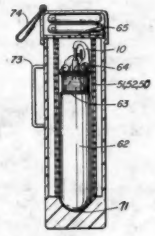
INFLATABLE BALLOON DISTRESS MARKER HAVING SMALL ARTICLE CONTAINING COMPARTMENT THEREIN

Ross M. Forward, 4714 Jubilee Rd., Halifax, N.S., Canada (B3H 2H8)

Filed Jun. 1, 1984, Ser. No. 616,179

Int. Cl.⁴ B64B *1/40*

U.S. Cl. 116—210 **14 Claims**



5. A rescue kit comprising a container having a removable cap, a cylinder having a neck and containing a lighter-than-air gas under pressure located in said container, a reel rotatably mounted on the neck of said cylinder and in co-axial relation therewith, a tether line wound on said reel for attaching to a balloon and a deflated inflatable balloon located in said container and removable therefrom, said balloon being made of thin, tough, air impervious material, a valved air inlet to said balloon for use in inflating said balloon by said lighter-than-air gas, a casing projecting into said balloon from a wall thereof and providing a compartment interiorly of the balloon, said casing having an extremely small volume relative to the internal volume of the balloon said compartment being accessible through an aperture in the wall of the balloon, said aperture being smaller in cross-section than a cross-section of the compartment in the balloon, a narrow rib circumscribing said aperture, said aperture providing an access opening to said compartment permitting insertion of an article thereinto, said rib facilitating retaining said article in the compartment and permitting removal of said article from said compartment, said

compartment and said valved air inlet being separate from one another and located at respective positions spaced apart from one another on the wall of the balloon and opposite one another.

4,586,457

DRUM-EQUIPPED APPARATUS FOR THE PRODUCTION OF COATED PILLS

Rudolf Dunajtschik, Lindau-Bodolz, Fed. Rep. of Germany, assignor to Driam Metallprodukt GmbH & Co. KG, Eriskirch, Fed. Rep. of Germany

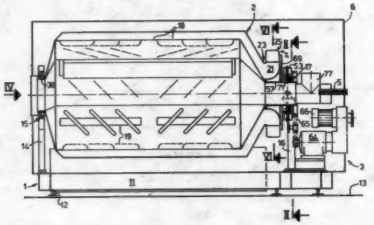
PCT No. PCT/EP84/00072, § 371 Date Nov. 16, 1984, § 102(e) Date Nov. 16, 1984, PCT Pub. No. WO84/03609, PCT Pub. Date Sep. 27, 1984

PCT Filed Mar. 13, 1984, Ser. No. 676,396

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1983, 3310031

Int. Cl.[4] B05C *5/00*; B05B *17/00*

U.S. Cl. 118—19 **17 Claims**



1. A pill-coating apparatus for covering granulates such as pill cores with a multilayer coating, said apparatus comprising a coating drum rotatable about a substantially horizontal axis, said drum being formed with a hub at each axial end thereof supported in two pivot bearings axially spaced with respect to each other, wherein at least one of said two pivot bearings is formed as a roatatable linkage, comprising a roller bearing connected to a support rotatably adjustable in any direction.

4,586,458

COATING APPARATUS FOR SCRATCHES OF GLASS BOTTLE

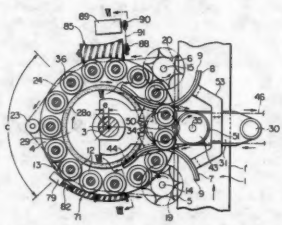
Kazuo Taguchi, Suita, and Yogiro Okawa, Takatsuki, both of Japan, assignors to Asahi Breweries Ltd., Tokyo, Japan

Filed Apr. 19, 1985, Ser. No. 725,054

Claims priority, application Japan, Apr. 27, 1984, 59-62425[U]; May 7, 1984, 59-66256[U]; Jul. 24, 1984, 59-111959[U]; Mar. 12, 1985, 60-35275[U]

Int. Cl.[4] B05C *1/02*

U.S. Cl. 118—72 **4 Claims**



1. A coating apparatus for scratches of a glass bottle comprising: in combination

a rotary disc which is mounted on a central shaft rotated by a first driving unit and is provided with a bottle-fed portion in one side of its rotational direction and a bottle-discharge portion in another side of its rotational direction; a coating roller which is rotatably supported by said central shaft of said rotary disc and makes its rotational center eccentric relative to a center of said central shaft toward a direction opposite to a direction where the bottle-feed and bottle-discharge portions of said rotary disc exist so that a peripheral surface of said coating roller is brought into slidable contact with a barrel surface of said bottle transferred on said rotary disc to apply coating liquid to the barrel surface of said bottle; a feed roller which abuts against the peripheral surface of said coating roller to rotate together with the same so that the coating liquid is fed to the peripheral surface of said coating roller from said feed roller; a feed member for feeding the coating liquid to a peripheral surface of said feed roller; a second driving unit rotatable together with said feed roller and said coating roller; a control equipment for controlling the output of said second driving unit to regulate the rotational speed of each of said rollers; and a bottle holding member for holding an upper and a lower portion of said bottle in a manner that, in application of the coating liquid through said coating roller, said bottle is held rotatably relative to said rotary disc to enable the barrel surface of said bottle to be brought into slidable contact with the peripheral surface of said coating roller.

4,586,459

LIQUID CHEMICAL APPLICATOR

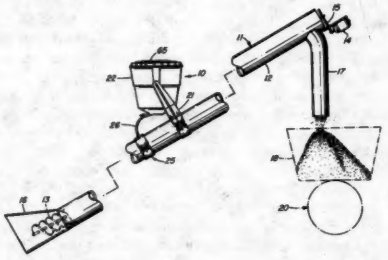
George Schultz, Champion, Canada, assignor to Gean Agricultural Manufacturing Ltd., Alberta, Canada

Filed Dec. 19, 1984, Ser. No. 683,754

Claims priority, application Canada, Dec. 4, 1984, 451825

Int. Cl.[4] B05B *15/06, 15/00*

U.S. Cl. 118—303 **19 Claims**



1. A device mountable directly on an outer casing of a screw type auger for introducing a liquid additive to a particulate material being conveyed through said auger, said device comprising:

a container for holding a supply of the additive and having an outlet means;

a bracket member having a clamp means for rigid attachment to said casing of said auger;

said bracket member including a pair of upwardly projecting arms having outer extremities sufficiently spaced to receive said container therebetween;

pivoting connection means provided on said outer extremities and on said container for mounting said container on said bracket member and for permitting adjustment of said container to an upright position;

an additive inlet member including means for providing connection thereof to said casing and means for communication with the interior of said casing; and

flexible conduit means for connecting said outlet means of said container to said inlet member for permitting flow of

the additive from the container to the interior of said auger.

4,586,460

DEVELOPING APPARATUS

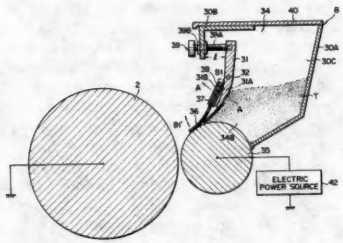
Mitsuaki Kohyama, Tokyo, and Takashi Shimazaki, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 31, 1984, Ser. No. 646,162

Claims priority, application Japan, Aug. 31, 1983, 58-161241

Int. Cl.[4] G03G *15/08*

U.S. Cl. 118—653 **6 Claims**



1. A developing apparatus which develops a latent image on an image-bearer by means of a developing agent, said apparatus comprising:

a developing agent carrier having a cylindrical surface on which the developing agent is carried, said developing agent carrier having its ends mounted for rotational movement about a central axis thereof so that a portion of said cylindrical surface establishes a gap with said image-bearer;

an elastic member having its elongated length disposed in a longitudinal direction substantially parallel to said central axis, said elastic member having a free end in resilient contact with the cylindrical surface of the developing agent carrier to exert a predetermined force thereagainst for applying the developing agent to the cylindrical surface so as to form a layer of the developing agent on the cylindrical surface of the developing agent carrier such that the formed layer is opposed to the image-bearer at said space to permit the developing agent to be deposited on a latent image on the image-bearer; and

supporting means defining a pivot axis extending through a longitudinal central portion of the elastic member, said pivot axis being perpendicular to said longitudinal direction, said supporting means pivotally supporting the elastic member for pivotal movements about said pivot axis, wherein said supporting means permits said predetermined force to be uniformly exerted against said cylindrical surface between the ends of said developing agent carrier due to pivotal movement of said elastic member about said pivot axis thereby forming a uniform layer on said cylindrical surface.

4,586,461

DRY-TYPE DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY

Matsusaburo Noguchi; Mikio Yamamoto, and Shinichi Furukawa, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Feb. 25, 1985, Ser. No. 705,302

Claims priority, application Japan, Feb. 27, 1984, 59-34381

Int. Cl.[4] B05C *11/00*

U.S. Cl. 118—663 **6 Claims**

1. A dry-type developing device for electrophotography, comprising:

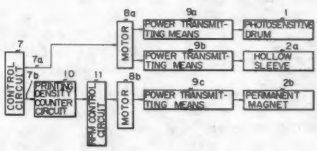
an electrostatic latent image carrier having means for receiving print data to form an electrostatic latent image thereon for being developed thereon;

a developer tank for holding a developer therein;

a developer roll rotatably disposed adjacent to said electrostatic latent image carrier so as to support developer supplied from said developer tank in frictional contact with said electrostatic latent image carrier to develope the latent image formed on said electrostatic latent image carrier;

means for supplying developer from said developer tank to said developer roll;

means for transmitting print data onto said electrostatic latent image carrier;



means for counting the printing density of the print data being transmitted by said transmitting means and providing a signal indicative of the printing density counted by said counting means; and

means, responsive to said signal, for controlling the rotational speed of said developing roll as a function of the printing density counted by said counting means so as to increase or decrease the amount of developer being supplied to said from said developer tank to said electrostatic latent image carrier dependent on the amount of developer being consumed to develope the latent image.

4,586,462

SUPPORT AND WITHDRAWAL MECHANISM FOR MILKING CLUSTERS

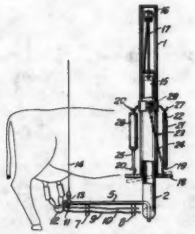
Friedrich Icking, Oelde, Fed. Rep. of Germany, assignor to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Feb. 8, 1985, Ser. No. 699,779

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1984, 3406878

Int. Cl.[4] A01J *7/00*

U.S. Cl. 119—14.1 **7 Claims**



1. A mechanism for supporting and withdrawing a milking cluster, comprising: a stationary vertical hollow main column; a support member slidably mounted in the bottom of the main column for rotation relative thereto and for up and down movement relative thereto, wherein the support member has a horizontal extension arm for holding a milking cluster at one end of the arm; a flexible tensioning element attached to said one end of the extension arm and attachable to a retraction device; means for compensating for the weight of the support member comprising a counterweight in the main column, a pulley connected in the main column above the support member and a cable extending around the pulley and connected to

the counterweight and the support member; a clamping element surrounding the support member below the main column and movable between a horizontal position wherein the support member is free to move up and down and rotatably relative to the clamping element and a tilted position wherein the clamping element moves with the support member; means mounting the clamping element comprising means forming two opposing suspension points on the clamping element and three suspension points on the main column including two suspension points aligned with the two suspension points on the clamping element and a third suspension point disposed at an acute to a right angle to a central axis between the points of suspension of the clamping element; an elastic element connecting one pair of the two aligned points of suspension on the main column and the clamping element; an inelastic element connecting said third suspension point on the main column and the suspension point on the clamping element for the elastic element; means including a cylinder and piston assembly connected between the other pair of two aligned points of suspension on the main column and the clamping element for effecting movement of the clamping element between the horizontal and tilted position in response to movement of the piston relative to the cylinder between a retracted and extended position; whereby upon the stopping of milk flow the piston extends to first tilt the clamping element so that it moves with the support member and thereafter effect the lowering and in connection with the inelastic element generate a torque on the clamping element and thus the support member to produce a movement of the horizontal arm which slopes downward and away from a cow's udders.

4,586,463

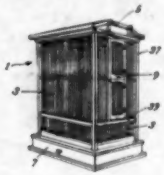
BIRD CAGE

Horst Braeuner, Hanover Park, Ill., assignor to The Original Vogelbauer Corporation, Hanover Park, Ill.

Filed Aug. 1, 1984, Ser. No. 636,813

Int. Cl.[4] A01K *31/06*

U.S. Cl. 119—17 **13 Claims**



1. A bird cage comprising an upper cage assembly for the confinement of a bird and a lower assembly for the collection of debris, the lower assembly including a plurality of opposed side walls, a first drawer and a second drawer, the opposed side walls defining a lower drawer position and an upper drawer position within the lower assembly, the opposed side walls including support means, the lower assembly being characterized by at least four positions, namely, a collection position, a first intermediate position, a second intermediate position, and a cleaning position;

(a) the collection position comprising the first drawer being positioned in the lower drawer position and the second drawer being positioned in the upper drawer position such that the second drawer is positioned to collect debris and rests on the first drawer;

(b) the first intermediate position comprising the second drawer being positioned in the lower drawer position and the first drawer being removed from the lower assembly;

(c) the second intermediate position comprising the first drawer being positioned in the upper drawer positica and the second drawer being positioned in the lower drawer position; and

(d) the cleaning position comprising the first drawer being positioned in the upper drawer position and the second drawer being removed from the lower assembly, the first drawer being supported by the support means;

the lower assembly being movable from the collection position to the first intermediate position by the removal of the first drawer from the lower assembly such that the second drawer descends from the upper drawer position to the lower drawer position, the lower assembly being movable from the first intermediate position to the collection position by the insertion of the first drawer beneath the second drawer such that the second drawer is forced up by the first drawer from the lower drawer position to the upper drawer position, the lower assembly being movable between the first intermediate position and the second intermediate position by the insertion or removal of the first drawer, and the lower assembly being movable between the second intermediate position and the cleaning position by the insertion or removal of the second drawer;

whereby cleaning of debris from the lower assembly may be accomplished by moving the lower assembly from the collection position to the first intermediate position to the second intermediate position to the cleaning position such that the second drawer may be cleaned while the first drawer is positioned to collect debris, and whereby the cleaned lower assembly may be returned to its collection position by moving the lower assembly from the cleaning position to the second intermediate position to the first intermediate position to the collection position.

4,586,464

ANIMAL-DRINKING VALVE

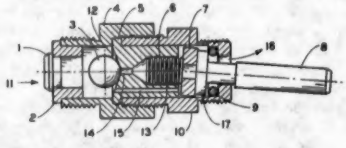
Jorgen Agerley, Kirkebjerg 9 Grongroft, DK-6200 Abenra, Denmark, and Konrad Werner, Am Wohld 28, 2301 Feim, Fed. Rep. of Germany

Filed Nov. 29, 1984, Ser. No. 675,988

Claims priority, application Denmark, Dec. 2, 1983, 5551/83; Fed. Rep. of Germany, Nov. 2, 1984, 8404184[U]

Int. Cl.[4] A01K *7/00*

U.S. Cl. 119—72.5 **7 Claims**



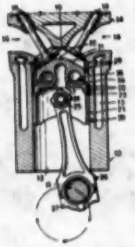
1. An animal drinking valve comprising a cylindrically hollow housing having an inlet at its upper end and an outlet at the lower end, a valve seat having a primary bore extending axially through its center, said valve seat being located in said housing and dividing said housing into an upper and a lower chamber communicating through said primary bore, a ball freely located in said upper chamber and an operating lever extending axially through said outlet opening having a flanged head abutting said outlet opening in said lower chamber, said lever being resiliently biased in a first position wherein said head closes said outlet and is movable into a second position wherein said outlet is open for the passage of fluid, said valve being disposed so that when said lever is in said first position said primary bore is open for fluid flow and when said lever is in said second position said ball occludes said primary bore.

4,586,465

INTERNAL COMBUSTION ENGINE

Michael R. Krogdahl, 79 Primrose St., Belgian Gardens, Townsville, Queensland, 4810, Australia

Continuation of Ser. No. 451,055, Dec. 20, 1982, abandoned.
This application Jan. 9, 1985, Ser. No. 689,983
Claims priority, application Australia, Feb. 4, 1982, 80208/82
Int. Cl.[4] F02B *33/14, 19/04*
U.S. Cl. 123—59 BS 7 Claims



1. An internal combustion engine of the type including:
an engine block having at least one cylinder, said cylinder having an upper portion and an upper crown portion;
a piston in the cylinder operatively connected to a crankshaft; and
a cylinder head, having at least one sparking plug, closing the cylinder, and a face;
wherein the improvement resides in:
the upper portion of the cylinder having a reduced diameter; the piston having an upper crown portion complementary to the upper portion of the cylinder and a face on said upper crown portion of said piston being complementary to the face of the cylinder head;
a primary combustion chamber formed above the upper crown portion of the piston; and
a secondary combustion chamber formed within the piston below the face of the piston and within the upper crown portion of the piston being substantially enclosed therein;
the secondary combustion chamber being annular in plan with a peripheral port under the upper crown portion of the piston interconnecting said chamber to the cylinder;
so arranged that:
during operation said piston cycles through an intake stroke, a compression stroke, a power stroke and an exhaust stroke; and
during the power stroke, an air/fuel mixture is compressed in both the primary and secondary combustion chambers; and
at and near top dead centre of the power stroke, said primary and secondary chambers are isolated from each other, and the sparking plug ignites the air/fuel mixture in the primary chamber and, as the piston descends in the cylinder said burning air/fuel mixture ignites the air/fuel mixture in the secondary chamber.

4,586,466

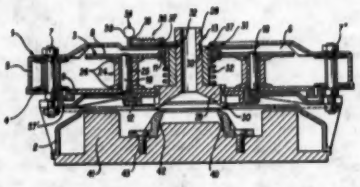
MECHANICAL STARTER FOR INTERNAL COMBUSTION ENGINES

Ermanno Fugazza, Rivoli, and Giuseppe Dal Poz, Pianezza, both of Italy, assignors to A.M.S.E.A. - Azienda Meccanica Stampaggi e Attrezzature S.p.A., Pianezza, Italy

Filed Mar. 7, 1983, Ser. No. 472,500
Claims priority, application Italy, Mar. 11, 1982, 20093 A/82
Int. Cl.[4] F02N *5/02;* F03G *1/04*
U.S. Cl. 123—179 S 9 Claims

1. A mechanical starter for an internal combustion engine, comprising:
a pair of coaxial disc-shaped elements, one of which is rotatable with respect to the other, at least two strips of elastomeric material whose axes lie on a same plane, said strips of elastomeric material having one end fixed to one disc-shaped element and the other end fixed to the other disc-shaped element, one of said disc-shaped elements being positioned innermost and within the other disc-shaped element and containing a plurality of small rollers for supporting and guiding said strips of elastomeric material, the axes of said plurality of small rollers being arranged on at least two arcs of a circle situated in opposite sectors of the innermost disc-shaped element;
non-vibrating means respectively provided on said innermost disc-shaped element for each strip, each said non-vibrating means being respectively associated with the small rollers arranged on one of said arcs and comprising a small roller arranged nearer an axis of rotation of said one rotatable disc-shaped element with respect to the associated small rollers arranged on said one arc, each said strip passing between one of the rollers on a said arc and a said small roller forming a said non-vibrating means;
means for rotating one of said disc-shaped elements with respect to the other so as to deform said strips to store energy therein;
means for connecting one of said disc-shaped elements to the shaft of an internal combustion engine; and
means for releasing the energy stored in said strips.

8. A mechanical starter for an internal combustion engine, comprising:
a pair of coaxial disc-shaped elements, one of which is rotatable with respect to the other, at least two strips of elastomeric material whose axes lie on a same plane, said strips of elastomeric material having one end fixed to one disc-shaped element and the other end fixed to the other disc-shaped element, one of said disc-shaped elements being positioned innermost and within the other disc-shaped element and containing a plurality of small rollers for supporting and guiding said strips of elastomeric material, the axes of said plurality of small rollers being arranged on at least two arcs of a circle situated in opposite sectors of the innermost disc-shaped element;



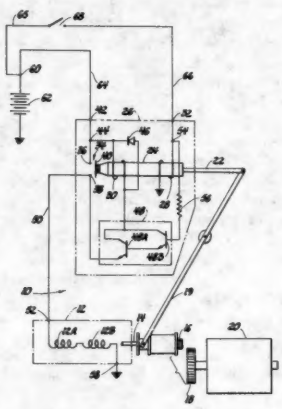
non-vibrating means respectively provided on said innermost disc-shaped element for each strip, each said non-vibrating means being respectively associated with the small rollers arranged on one of said arcs and comprising a small roller arranged nearer an axis of rotation of said one rotatable disc-shaped element with respect to the associated small rollers arranged on said one arc, each said strip passing between one of the rollers on a said arc and a said small roller forming a said non-vibrating means;
means for rotating one of said disc-shaped elements with respect to the other so as to deform said strips to store energy therein;
means for connecting one of said disc-shaped elements to the shaft of an internal combustion engine; and
means for releasing the energy stored in said strips, whereby upon rotation of the innermost disc-shaped element, each one of the strips of elastomeric material is deformed and leans against the plurality of small rollers belonging to the sector which is opposite to the same strip when the starter is in the rest condition.

4,586,467

ELECTRIC STARTING APPARATUS

Louis J. Raver, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 27, 1983, Ser. No. 545,893
Int. Cl.[4] F02N *11/08*; H01H *47/08*
U.S. Cl. 123—179 B **4 Claims**



1. An electric starting system for cranking an engine comprising, a source of voltage, an electric starter comprising an electric cranking motor and a solenoid having pull-in and hold-in coils and a shiftable plunger, a pinion that is shifted by movement of said plunger that is adapted to mesh with the ring gear of said engine, switch means having first and second contacts that are at times electrically connected by a contactor shiftable by movement of said plunger, a manually operable start switch, means connecting said start switch and said hold-in coil in series and across said voltage source whereby said hold-in coil is energized when said start switch is closed and is deenergized when said start switch is opened, means connecting one side of said voltage source to said first contact, means connecting an opposite side of said voltage source to one side of said cranking motor, a circuit connecting said first contact to an opposite side of said cranking motor comprising in a series connection said pull-in coil and the current carrying electrodes of a semiconductor switch, a circuit connecting said second contact to said opposite side of said cranking motor, and means connecting a control electrode of said semiconductor switch to said start switch such that said semiconductor switch is biased conductive between its current carrying electrodes to energize said pull-in coil when said start switch is closed.

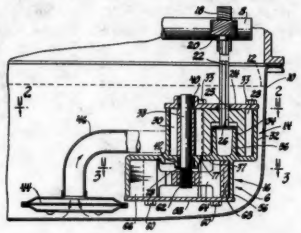
4,586,468

TANDEM PUMP ASSEMBLY

Donald L. Dzioba, Frankenmuth, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 5, 1984, Ser. No. 658,278
Int. Cl.[4] F02B *77/14*; F04B *17/00, 23/12*; E04C *11/00*
U.S. Cl. 123—198 C **1 Claim**

1. In combination, an engine having an oil pan containing oil at a certain level, a tandem pump arrangement mounted in said oil pan, said pump arrangement comprising an oil pump for delivering the oil under pressure to lubricate the engine and a vacuum pump for establishing a vacuum, said oil pump having two meshing gears of different pitch diameter adapted to produce oil pumping action by their meshing engagement upon drive to the one gear having the larger pitch diameter and the drive thereby of the other gear having the smaller pitch diameter at a higher speed, drive means for connecting the engine to drive said one gear, said vacuum pump having an input connected to be driven by said other gear whereby said vacuum pump is driven through said oil pump at increased speed with an overdrive ratio determined by the ratio of the pitch diameters of said gears, said vacuum pump being lubricated by the oil in the oil pan and having an exhaust line exiting in the oil pan above said oil level so as to ensure return of such oil to the oil pan.

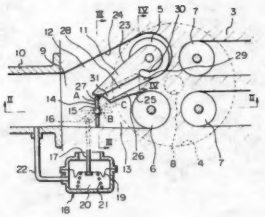


4,586,469

INTAKE DEVICE OF AN INTERNAL COMBUSTION ENGINE

Takeshi Okumura; Kiyoshi Nakanishi, and Souichi Matsushita, all of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jun. 17, 1985, Ser. No. 744,997
Claims priority, application Japan, Aug. 29, 1984, 59-178215
Int. Cl.[4] F02B *31/00*
U.S. Cl. 123—308 **9 Claims**



1. An intake device of an internal combustion engine, comprising:

an intake port;

a separating wall arranged in said intake port and dividing an interior of said intake port into a straight port and a helical-shaped port which has a helical portion having a helix terminating portion;

a control valve arranged in said straight port;

a projection formed on a side wall of said separating wall, which defines said straight port, at a position downstream of said control valve, said projection having a tip face directed upstream of said intake port;

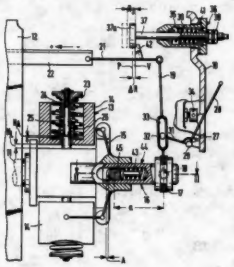
a bypass passage formed in said separating wall and having an inlet opening and an outlet opening which is open to said helix terminating portion, said inlet opening being formed on said tip face; and

an actuator for actuating said control valve in response to an engine load to close said control valve when the engine load is lower than a predetermined load and to open said control valve when the engine load is higher than the predetermined load.

4,586,470
CENTRIFUGAL SPEED GOVERNOR FOR FUEL-INJECTED INTERNAL COMBUSTION ENGINES

Horst Klinger, Ludwigsburg; Werner Lehmann, Gerlingen, and Michael Zeuch, Bietigheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 16, 1985, Ser. No. 723,777
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1984, 3414846
Int. Cl.[4] F02D *31/00*
U.S. Cl. 123—367 8 Claims



1. A centrifugal speed governor for fuel-injected internal combustion engines, which functions as a minimum-maximum-speed governor comprising:

a housing, a governor, said governor including a pair of flyweights and governor springs supported by said flyweights, said governor springs including at least one idling spring and at least one maximum-speed governor spring, a governor sleeve adapted to be displaceable by said flyweights in accordance with rpm counter to a force of the governor springs, said governor sleeve adapted to move a governor rod via an intermediate lever, which is actuatable by means of a pivotably adjusting member which is pivoted against an end stop attached to said housing for adjusting a supply quantity, said adjusting member when in its maximally pivoted position setting for a maximum possible supply quantity rests on said end stop, a resiliently yielding governor rod stop in which a movement of the governor rod in a direction of an increasing supply quantity is limited by said resiliently yielding governor rod stop, said governor rod stop includes a starting spring which restricts movement of said governor rod stop, said intermediate lever including a connecting strap which is secured to said governor rod, a counterstop secured to said connecting strap, said governor rod stop engaging said counterstop, end stop of the adjusting member is adjusted into a position which is associated with a basic test position (P; P') of the governor rod located above the full-load position (V;V') by a slight differential travel (ΔR; ΔR'), wherein this differential travel (ΔR, ΔR') is fixed to an amount on the order of magnitude of a few tenths of a millimeter;

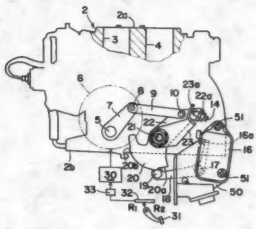
an accumulator located between an articulation point of said flyweights on said governor sleeve and said counterstop on said connecting strap joined to the governor rod, said accumulator includes a drag spring, the maximum possible deflection stroke (A) of the accumulator, enabling a shortening of its effective structural length by a distance a, being limited by a stroke stop in said accumulator and being only slightly longer than the differential travel (ΔR; ΔR'), of the governor rod; and

the governor rod is pressed by means of said governor rod stop away from the basic test postion (P; P') into its full-load position (V; V') and retained there, as soon as and for as long as said adjusting member rests on the end stop and the governor sleeve maintains its position assumed after an idling stroke (H_L) has been traversed.

4,586,471
FUEL CONTROL MECHANISM FOR INTERNAL COMBUSTION ENGINE

Osamu Horada, Chigasaki, and Yasusuke Anda, Fujisawa, both of Japan, assignors to Isuzu Motors, Ltd., Japan

Filed Dec. 4, 1984, Ser. No. 678,018
Int. Cl.[4] F02D *9/02*
U.S. Cl. 123—399 20 Claims



1. An internal combustion engine fuel control system comprising:

fuel supply means for controlling the supply of fuel to an internal combustion engine;

a first operator means mechanically coupled to said supply means and operative to adjust the level of fuel supplied thereby;

a second operator means;

sensor means for sensing the position of a manually actuated accelerator pedal for the engine;

control means responsive to said sensor means and providing an output dependent upon the accelerator position sensed thereby;

driving means responsive to said control means and producing a degree of movement of said second operator means dependent upon said output of said control means; and

coupling means mechanically coupling said first and second operator means so as to alternatively provide either common or independent movement thereof; said coupling means permitting a predetermined degree of independent movement of said second operator means in response to initial actuation of the pedal and coupling said first and second operator means so as to produce common movement thereof in response to further actuation of the pedal.

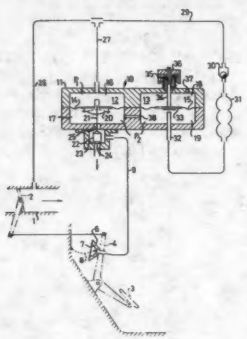
4,586,472
ARRANGEMENT IN MOTOR VEHICLES FOR INDICATING ENGINE LOADS

Olle Andersson, Gothenburg, and Bengt L. Mörner, Hovås, both of Sweden, assignors to AB Volvo, Göteborg, Sweden

Filed Nov. 6, 1984, Ser. No. 668,986
Claims priority, application Sweden, Nov. 9, 1983, 8306168
Int. Cl.[4] F02D *9/00*
U.S. Cl. 123—401 10 Claims

1. In an engine-load indicating arrangement in motor vehicles, comprising power-influencing means controlled by the engine intake pressure and coordinated with the throttle valve of the engine so as to create a resistance against increase in throttle in dependence upon the intake pressure; the improvement in which the power-influencing means is co-ordinated with means which compares the intake pressure of the engine with a reference pressure previously established therein to activate the power-influencing means in a manner to exert resistance against an increase in the throttle when the intake

pressure of the engine reaches said reference pressure and to set the power-influencing means to an inactivate state when



said reference pressure falls beneath the intake pressure of the engine.

4,586,473

METHOD FOR THE SELF-ADAPTIVE CONTROL OF THE ANGLE OF IGNITION ADVANCE OF A THERMAL ENGINE HAVING POSITIVE IGNITION

Huu-Can Nguyen, Portet-sur-Garonne, France, assignor to Equipements Automobiles Marshall, Issy-les-Moulineaux, France

PCT No. PCT/FR83/00152, § 371 Date Mar. 27, 1984, § 102(e) Date Mar. 27, 1984, PCT Pub. No. WO84/00581, PCT Pub. Date Feb. 16, 1984

PCT Filed Jul. 22, 1983, Ser. No. 601,621

Claims priority, application France, Jul. 27, 1982, 82 13095; Oct. 27, 1982, 82 18017

Int. Cl.[4] F02P *5/04*

U.S. Cl. 123—419 **15 Claims**

1. A method for the self-adaptive control of the angle of ignition advance of a thermal engine having positive ignition, in particular for use in a motor vehicle, in which an iterative search operation for an optimum value θ_{opt} of the angle of advance is carried out, the method comprising the steps of:

periodically adding an angle of advance increment $\Delta\theta$ to an instantaneous angle of advance θ_o,

detecting the instantaneous speeds N_1 and N_2 of the engine corresponding to the angles of advance θ_o and $\theta_o+\Delta\theta$, respectively,

determining the direction of variation of the speed N of the engine,

correcting the angle of advance θ_o such that the speed variation ΔN is as low as possible, or even zero, so that the angle of advance θ_o is kept in the vicinity of its optimum value θ_{opt},

detecting instantaneous speeds N_1 and N_2 of the engine at the end of each half-period of the iterative operation,

selecting the duration of the half-period as a function of the speed N of the engine,

determining the direction of variation of the speed N of the engine by comparing the speed N_{1t} at the end of a half-period with no angle of advance increment $\Delta\theta$, during a measurement of rank t, with the speeds $N_{2(t-1)}$ and N_{2t} at the end of half-periods with angle of advance increments $\Delta\theta$ respectively during the previous measurement of rank $t-1$ and during the measurment of rank t,

correcting the angle of advance θ_o by respectively adding thereto or subtracting therefrom a value $\epsilon\theta \leqq \Delta\theta$ if the speed N_{1t} is, for a number m of comparisons between 1 and 10, respectively lower or greater than the speeds $N_{2(t-1)}$ and N_{2t}, in order to bring the instaantaneous angle of advance θ_o toward its optimum value θ_{opt} in a progressive manner, while avoiding correction if the speeds N_{1t}, N_{2t} and $N_{2(t-1)}$ are substantially equal, and when the speed N_{1t} lies between the speeds $N_{2(t-1)}$ and N_{2t}, correcting the angle of advance by superposing curve data giving the angle of advance as a function of the engine speed.

4,586,474

KNOCK SUPPRESSION APPARATUS FOR INTERNAL COMBUSTION ENGINE

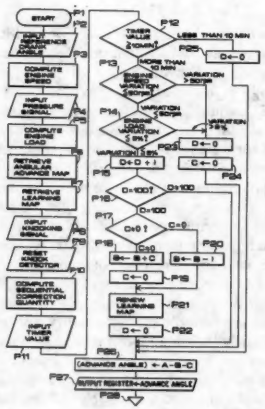
Masahira Akasu, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 1, 1984, Ser. No. 616,233

Claims priority, application Japan, Jun. 3, 1983, 58-99680; Jun. 3, 1983, 58-99681

Int. Cl.[4] F02P *5/15*

U.S. Cl. 123—425 **6 Claims**



1. A knock suppression apparatus for an internal combustion engine, comprising:

means for detecting knock induced in the engine;

means for detecting the load state of the engine;

means for detecting the rotational speed of the engine;

means for detecting the transient running state of the engine;

memory means for storing corrective control values corresponding to the individual running modes of the engine each represented by a combination of the load and the rotational speed of the engine and, in response to the input information from said load detecting means and said speed detecting means, outputting the corrective control value corresponding to said information;

means for correcting the control value which controls at least one of the operating characteristic values of said engine by using the value read out from said memory means and the output of said knock detecting means, said control value being so corrected at each ignition cycle;

renewal control means responsive to the output of said knock detecting means and renewing, in the direction of knock suppression, the corrective control value stored in said memory means or, in the absence of any knock detec-

tion output, renewing said stored corrective control value in the reverse direction, said renewal control means being arranged to effect renewal of said corrective control value only at intervals corresponding to a plurality of ignition cycles; and

means for prohibiting the action of said renewal control means when a transient running state is detected by said means for detecting the transient running state of the engine.

4,586,475

IGNITION TIMING CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

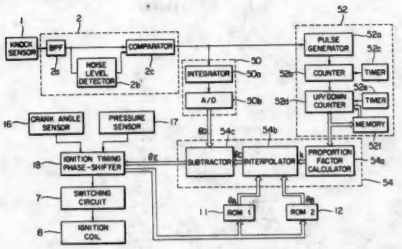
Akira Takahashi; Yoshiaki Danno; Kazumasa Iida, all of Kyoto, and Toshio Iwata, Himeji, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kaisha and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed Nov. 27, 1984, Ser. No. 675,218

Claims priority, application Japan, Nov. 29, 1983, 58-244660

Int. Cl.[4] F02P *5/15*

U.S. Cl. 123—425 **12 Claims**



1. An ignition timing control apparatus for an internal combustion engine having reference ignition timing comprising:

sensing means for sensing vibrations including knocks of said engine;

knock signal deriving means for deriving knock signals from the output of said sensing means;

correction magnitude determining means for determining from said knock signals derived by said knock signal deriving means an ignition timing correction magnitude for suppressing the occurence of knock;

displacement magnitude determining means for determining from at least one of an output of said knock signal deriving means and an output of said correction magnitude determining means a displacement magnitude for said reference ignition timing corresponding to the octane rating of fuel used in said engine; and

ignition timing determining means for setting the reference ignition timing at an optimum ignition timing angle for said engine responsive to the correction magnitude determined by said correction magnitude determining means and the displacement magnitude determined by said displacement magnitude determining means; and

means for retaining a pre-determined displacement magnitude when said engine is outside at least one of a predetermined operating region and a predetermined operating condition so that said ingition timing determining means sets the reference ignition timing according to the retained pre-determined displacement magnitude when said engine is outside one of said region and said condition, respectively.

4,586,476

AIR-TO-FUEL RATIO DETECTOR FOR ENGINES

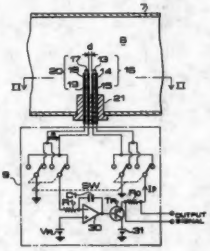
Yoshiaki Asayama, and Seiya Kominami, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 12, 1984, Ser. No. 660,274

Claims priority, application Japan, Oct. 14, 1983, 58-192889; Nov. 24, 1983, 58-221087

Int. Cl.[4] F02B *33/00*

U.S. Cl. 123—440 **6 Claims**



1. An air-to-fuel ratio detector for an engine, comprising:

an air-to-fuel ratio sensor having an oxygen pump and an oxygen sensor disposed opposite to each other with a minute gap therebetween in an exhaust gas passage of said engine and each consisting of a flat plate of a solid electrolyte and electrodes attached to the opposite sides of the flat plate respectively;

means for supplying a pump current to said oxygen pump;

means for detecting the magnitude of an electromotive force of said oxygen sensor generated proportionally to the difference between the oxygen partial pressure within said minute gap and the oxygen partial pressure outside said minute gap by said oxygen pump supplied with a predetermined pump current;

means for controlling the pump current to be supplied to said oxygen pump so that the electromotive force detected by said electromotive force detecting means is maintained at a fixed level;

means for generating an air-to-fuel ratio detection output signal which is proportional to the pump current; and

means for changing over the direction of the pump current supplied to said oxygen pump and the polarity of the output signal of said oxygen sensor simultaneously.

4,586,477

FUEL RAIL ASSEMBLY

Martin J. Field, Churchville, and Donald A. Rosin, Rochester, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

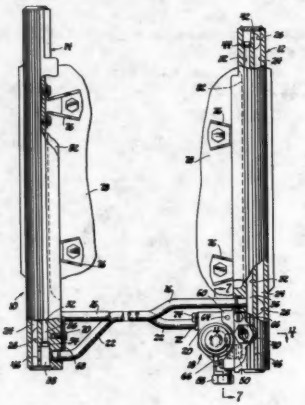
Filed Jun. 3, 1985, Ser. No. 740,416

Int. Cl.[4] F02M *55/00*

U.S. Cl. 123—468 **1 Claim**

1. A fuel rail assembly comprising a pair of fuel rail bodies each having a fuel supply passage and a bore substantially parallel to said passage, each of said bores having a plug dividing the bore into an inlet region and a discharge region, one of said fuel rail bodies having an inlet fuel fitting for providing fuel to the associated inlet region, an inlet crossover tube for fuel flow from the inlet region of said one fuel rail body to the inlet region of the other fuel rail body, each of said fuel rail bodies having a window for fuel flow from the associated inlet region to one end of the associated supply passage and including a restriction for balancing the fuel flow through said inlet regions to said supply passages, each of said fuel rail bodies further having a connection for fuel flow from the other end of the associated supply passage to the associated discharge region and wherein at least one of said connections is formed by

a cross bore extending through the associated discharge region to the other end of the associated supply passage, and a discharge tube received in said cross bore for discharging fuel



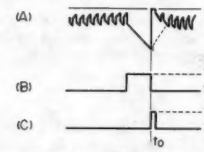
from said discharge region, whereby said inlet crossover tube and said discharge tube are disposed closely adjacent one another to minimize the space required for the fuel rail assembly.

4,586,478

AIR-FUEL RATIO CONTROL METHOD AND APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Susumu Nogami; Yukio Suzuki; Hiroshi Takahashi, and Kan Otsuka, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Aug. 9, 1982, Ser. No. 406,528
Claims priority, application Japan, Aug. 13, 1981, 56-125987
Int. Cl.[4] F02M *51/00*
U.S. Cl. 123—489 **8 Claims**



1. An air-fuel ratio control method for an internal combustion engine, including the steps of:

detecting the concentration of a predetermined component of the exhaust gas;

calculating, as a function of detected concentration, an air-fuel ratio correction factor to obtain a stochiometric air-fuel ratio;

detecting an engine temperature;

correcting an amount of fuel supplied to the engine in accordance with said detected engine temperature under an engine warm-up condition;

correcting with closed-loop control the amount of fuel supplied to the engine in accordance with said air-fuel ratio correction factor, said closed-loop correcting being performed even when the engine is under a warm-up condition;

determining whether the engine is under a warm-up condition;

determining whether the engine is under an accelerating condition;

stopping closed-loop air-fuel ratio control for a predetermined constant period of time by fixing said air-fuel ratio correction factor to a predetermined constant value when the engine is determined to be in both the accelerating and warm-up conditions, said predetermined constant value being equal to a value of the air-fuel ratio correction factor at a time when the closed-loop air-fuel ratio correction amount is zero; and

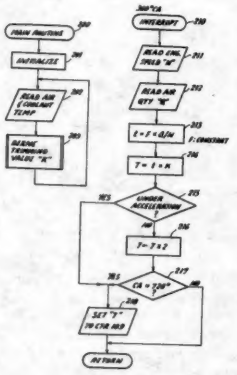
resuming closed-loop air-fuel ratio control when said predetermined constant period of time has elapsed to subsequently obtain a stoichiometric air-fuel ratio under the accelerating condition.

4,586,479

ELECTRONIC FUEL INJECTION CONTROL WITH VARIABLE INJECTION INTERVALS

Shigenori Isomura, and Yasumasa Kaji, both of Kariya, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Apr. 4, 1984, Ser. No. 596,593
Claims priority, application Japan, Apr. 5, 1983, 58-60312
Int. Cl.[4] F02D *41/10*
U.S. Cl. 123—492 **8 Claims**



1. A fuel injection control system for an internal combustion engine having fuel injectors, comprising:

first means for monitoring operating conditions of said engine;

second means for detecting whether said engine is in an accelerating condition in accordance with the monitored operating conditions, computing an amount of fuel to be injected into said engine in accordance with the monitored operating conditions, generating at occurrence of a predetermined rotation of said engine a first series of pulses, each pulse having a duration greater by a predetermined value than a duration corresponding to said computed amount of fuel, and generating during the detected acceleration condition a second series of pulses, the pulses of said second series being interposed, in time, between those of said first series, said pulses of said second series having a duration corresponding to said computed amount of fuel; and

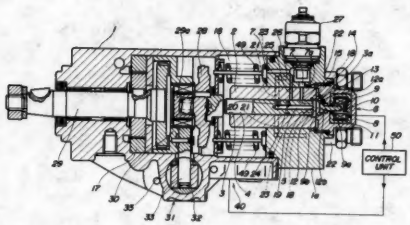
third means for activating said fuel injectors in response to the pulses of both said first and second series.

4,586,480

ELECTRONICALLY CONTROLLED DISTRIBUTOR TYPE FUEL INJECTION PUMP

Masayoshi Kobayashi; Shinya Nozaki; Keiichi Yamada, and Tadashi Kobayashi, all of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Nov. 20, 1984, Ser. No. 673,362
Claims priority, application Japan, Nov. 26, 1983, 58-222762
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—506 6 Claims



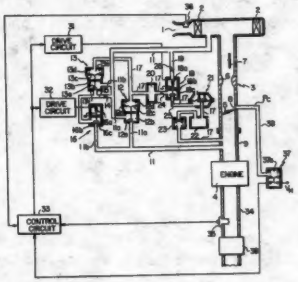
1. A distributor type fuel injection pump comprising:
a plunger barrel;
a plunger received within said plunger barrel for concurrent reciprocating and rotative motion for suction, pressure delivery and distribution of fuel;
a pair of cut-off ports formed in said plunger and said plunger barrel at a predetermined axial location and registrable with each other to spill pressurized fuel in said plunger into a zone under lower pressure;
a communication passageway communicating a pump working chamber defined by said plunger at one end thereof with said zone under lower pressure;
a fuel suction passage extending between said pump working chamber and said zone under lower pressure;
said communication passageway extending between said pump working chamber and an intermediate portion of said fuel suction passage;
a solenoid valve arranged across said communication passageway for blocking same; and
control means for controlling means for controlling said solenoid valve to cause same to selectively assume an open position and a closed position;
wherein while said plunger moves toward said pump working chamber, said solenoid valve is closed by said control means to start injection of fuel present in said pump working chamber, and upon registration of said cut-off ports with each other, the fuel injection is terminated;
said solenoid valve including a valve body disposed opposite an end face of said one end of said plunger, a valve seat on which said valve body is seatable, said valve body and said valve seat being arranged such that said valve body is kept off from said valve seat to assume said open position when it is biased toward said plunger, and is seated on said valve seat to assume said closed position when it is biased away from said plunger, urging means acting upon said valve body to bias same to said open position, and a solenoid energizable for biasing said valve body to said closed position against the force of said urging means;
said control means including means for selectively energizing or deenergizing said solenoid for causing said valve body to selectively assume said closed position or said open position.

4,586,481

SECONDARY AIR SUPPLY FOR INTERNAL COMBUSTION ENGINE

Eiji Kishida, Tokyo, and Shumpei Hasegawa, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 4, 1984, Ser. No. 647,312
Claims priority, application Japan, Sep. 3, 1983, 58-162442
Int. Cl.[4] F02M *23/04*
U.S. Cl. 123—587 7 Claims



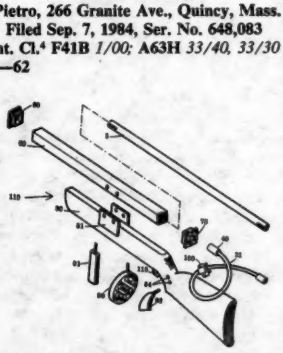
1. A secondary air intake system for an internal combustion engine having a primary air intake passage with a throttle valve and an exhaust system comprising: means for determining an air-fuel ratio, first and second secondary air passages communicating with the downstream of the throttle valve of a carburetor, a first vacuum operated air control valve positioned in said first secondary air passage for changing the effective area of said first secondary air passage in accordance with the vacuum in a first vacuum receiving chamber, an electrically operated air control valve positioned in said second secondary air passage for opening and closing said second secondary air passage in accordance with said determined air-fuel ratio, a second vacuum operated air control valve positioned in said second secondary air passage for changing the effective area of said second secondary air passage in accordance with the vacuum in a second vacuum receiving chamber; and a vacuum control means for applying the same control vacuum to said first and second vacuum receiving chambers so that the effective areas of both first and second secondary air passages may be gradually increased or decreased to maintain a desired engine air-fuel ratio.

4,586,482

TOY BLOW GUN

Vincent Di Pietro, 266 Granite Ave., Quincy, Mass. 02169

Filed Sep. 7, 1984, Ser. No. 648,083
Int. Cl.[4] F41B *1/00*; A63H *33/40, 33/30*
U.S. Cl. 124—62 26 Claims



1. A toy blow gun comprising:

a barrel including a bore, a first end, a second end, and means extending from an end of said tube for allowing air to enter said bore, said means for allowing air to enter being located on the barrel near each of said ends a greater distance from each of said ends than the maximum distance over which a human mouth is capable of extending over either of said ends; and

a blow tube including means for sealing the means for allowing air to enter said bore, said blow tube and said barrel forming a sealed blow path for blowing a projectile through said bore when said means for sealing is attached to one of said ends and sealing said means for allowing air to enter said bore.

4,586,483

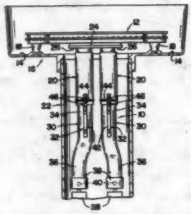
ADJUSTABLE DUAL VENTURI ASSEMBLY

Manuel Perez, 11204 Hidden Valley, Tampa, Fla. 33624

Filed Jun. 29, 1984, Ser. No. 626,224

Int. Cl.⁴ F24C *3/04*

U.S. Cl. 126—41 R **1 Claim**



1. An adjustable dual mixing assembly specifically configured for use with a dual burner gas grill including a burner element having a pair of gas supply tubes affixed thereto and a pair of corresponding gas supply nozzles in spaced relationship to the pair of gas supply tubes, said adjustable dual mixing assembly comprising a pair of mixing tubes corresponding to the pair of gas supply tubes and gas supply nozzles, each said mixing tube comprising an inner base member and an arcuate gas supply member including a lower gas supply element having a longitudinal center line offset from the center line of said inner base member and substantially parallel thereto, each said mixing tube being telescopingly and rotatably disposed within the corresponding gas supply tube to permit longitudinal and lateral adjustment of each said lower gas supply element relative to the corresponding gas supply nozzle; said adjustable dual mixing assembly further including a securing means having a securing device corresponding to each of said mixing tubes, each said securing device including an elongated flexible interconnecting member movable between a first and second position including a plurality of grooves formed thereon attached to each of said corresponding mixing tubes to permit longitudinal movement of each said lower gas supply element relative to the corresponding gas supply nozzle when in said second position and an annular rib formed on each said corresponding gas supply tube, each said annular rib being disposed to selectively receive one of said grooves of said corresponding elongated flexible interconnecting member to secure said mixing tube longitudinal when in said first position and permits rotational movement of said mixing tube relative to the corresponding gas supply tube.

4,586,484

SPACE HEATER FOR SMALL COMPARTMENTS

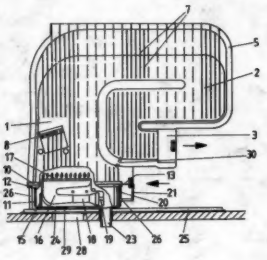
Wilhelm Mossbach, Kirchseen, Fed. Rep. of Germany, assignor to Philipp Kreis GmbH & Co. Truma-Geratebau, Putzbrunn, Fed. Rep. of Germany

Filed Aug. 8, 1984, Ser. No. 638,889

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1983, 3328591

Int. Cl.⁴ F24C *3/00*

U.S. Cl. 126—91 R **10 Claims**



1. A space heater for small compartments which comprises:

an upwardly open bottom tray having an outwardly extending connection flange at an upper rim thereof;

a burner received in said tray, said tray being formed with a lateral air inlet opening; and

a heater body mounted on said tray, said heater body comprising an upwardly extending combustion chamber formed at a lower end with an outwardly extending mounting flange coextensive with and secured to said connection flange, and a heat exchanger communicating with said combustion chamber having a downwardly extending portion and formed with a flue-gas outlet.

4,586,485

HEATING DRUM FOR RADIANT HEATER AND METHOD OF MANUFACTURE THEREOF

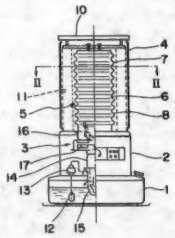
Yositaka Koba, Ibaraki; Yoshiki Hayashi, Settsu, and Kunikazu Torikoshi, Osaka, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Jun. 8, 1984, Ser. No. 618,900

Claims priority, application Japan, Nov. 11, 1983, 58-212989; Nov. 11, 1983, 58-212990; Nov. 11, 1983, 58-212991

Int. Cl.⁴ F24C *1/00*

U.S. Cl. 126—248 **11 Claims**



1. A heating drum for us in a radiant heater having a burner for the combustion of fuel, which comprises:

an axially corrugated barrel made of steel material and forming therein a generally cylindrical inner chamber and a plurality of annular chambers communicated with the cylindrical inner chamber and alternating with concave exterior spaces over the length thereof, said cylindrical

inner chamber being defined by furrow-defining walls and each of said annular chambers being defined by a ridge-defining wall and opposedly inclined first and second annular side walls on respective sides of the associated ridge-defining wall;

said barrel having one end closed and the other end adapted to seat over the burner;

said barrel having first circumferential rows of combustion gas outlet perforations, the combustion gas outlet perforations of each row being defined in at least one of the first and second annular side walls for each annular chamber; and

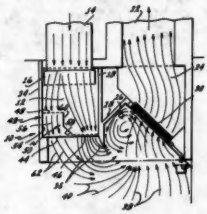
each of the combustion gas outlet perforations of all of the rows opens outwardly towards, so as to confront, the other of the first and second annular side walls of the next adjacent annular chamber such that combustion gas exiting these perforations impinge upon and heat an adjacent annular side wall.

4,586,486

MULTILEVEL AIR DISTRIBUTION PANEL FOR AIR VENTILATION HOOD

Arnold S. Kaufman, Studio City, Calif., assignor to National Air Systems, Inc., Glendale, Calif.

Filed Jul. 6, 1984, Ser. No. 628,290
Int. Cl.[4] F21C *15/08*; F23J *11/00*
U.S. Cl. 126—299 D **28 Claims**



18. For use with a make-up air ventilating hood of the type having a make-up plenum defined between a divider wall and an opposing hood wall, an exhaust plenum, means for supplying make-up air to said make-up plenum, and means for exhausting air from said exhaust plenum such that make-up air flows from said make-up plenum under the lower edge of said divider wall and is drawn into said exhaust plenum, an air distribution panel comprising:

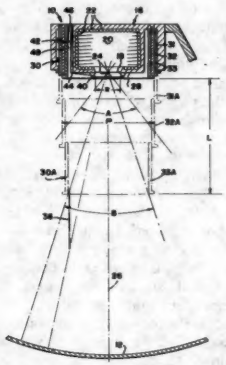
a planar frame for mounting in said make-up plenum between said divider wall and said opposing hood wall, said frame having an upstream side and a downstream side, duct means attached to said frame on said upstream side so as to define a first make-up air flow path through said duct means and said frame and a second make-up air flow path through said frame external to said duct means, first air flow restricting means mounted to said frame adjacent to said dividing wall for restricting air flow through said first flow path, and second flow restricting means mounted to said duct means upstream of said first flow restricting means and adjacent said to opposing wall for restricting flow through said second flow path, said duct means including a lower wall portion flaring towards said first flow restricting means for directing air flowing through said second flow path into merger with air flowing through said first flow path and towards said exhaust plenum.

4,586,487

PROTECTIVE TELESCOPING SHIELD FOR SOLAR CONCENTRATOR

Maurice J. Argoud, Los Angeles; Walter L. Walker, Duarte, and Lloyd V. Butler, El Monte, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Feb. 22, 1984, Ser. No. 582,495
Int. Cl.[4] F24J *2/46*
U.S. Cl. 126—418 **7 Claims**



1. A solar heating apparatus comprising:

a reflector dish concentrator having an axis;

a solar receiver positioned along said axis to receive concentrated sunlight from said reflection dish through a receiver opening;

a protection structure having a central opening and a generally tubular body configuration with a side wall surrounding said receiver opening;

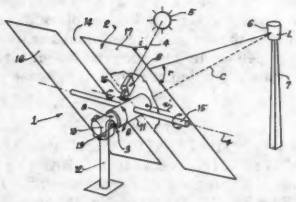
said protection structure being extendible from said receiver in the direction of said reflector dish such that the tubular body of the protection device extends into the reflected sunlight from the concentrator with a portion of the sunlight impinging on the side wall surface while sunlight is permitted to pass through the central opening from the concentrator to said central opening.

4,586,488

REFLECTIVE SOLAR TRACKING SYSTEM

Vincent H. Noto, 2752 Imperial Ave., San Diego, Calif. 92102

Filed Dec. 15, 1983, Ser. No. 561,880
Int. Cl.[4] F24J *3/02*; G01J *1/20*
U.S. Cl. 126—425 **11 Claims**



1. A reflective solar tracking system for reflecting light rays from the sun onto a remote solar energy collector, the system comprising:

a reflector for reflecting light rays from the sun onto said collector;

a mounting assembly for mounting said reflector relative to said collector so that said reflector is rotatable about a first axis pointing at the collector, and about a second axis transverse to the first for controlling elevational tilt of said reflector;

sensor means for pointing at the sun and sensing directional changes in the sun's position, said sensor means including means for producing control signals in response to said directional changes;

said mounting assembly including means for mounting said sensor means so that it is rotatable about said first axis to control its azimuthal pointing direction and about a third axis parallel to said second axis for controlling its altitudinal pointing direction; and

a drive mechanism for rotating said reflector and sensor means about the respective axes of rotation in response to said control signals so that said sensor means tracks the sun and said reflector moves so as to reflect light rays from the sun onto the collector;

said mounting assembly comprising a cylindrical member adapted to be fixed in position to point along said first axis through the center of the plane of said reflector, and a sleeve rotatably mounted on said member, a mounting shaft for said reflector extending transversely along said second axis through said sleeve and being secured to said reflector on opposite sides of said sleeve, said shaft being rotatably mounted in said sleeve to control tilt of said reflector, said reflector having an opening extending transverse to said shaft through which said sleeve projects to point at said collector.

4,586,489

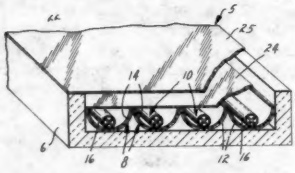
SEMI-CONCENTRATING SOLAR ENERGY COLLECTOR

Gerhard W. Voll, Mounds View, Minn., and Richard L. Weiher, Hudson Township, St. Croix County, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 21, 1984, Ser. No. 684,451

Int. Cl.[4] F24J *2/10*

U.S. Cl. 126—438 **13 Claims**



1. A solar collector comprising a plurality of generally semi-cylindrical reflectors disposed in parallel relationship with the open sides of said reflectors disposed in a plane, a transparent hollow tube disposed within each reflector and adapted to carry a liquid from one end toward the other, said tubes having on the interior surface thereof an array of nested cube-corners, and absorber means disposed in said tube to absorb sun energy efficiently to heat the surface thereof, said transparent tube interior surface defined by cube-corners having an index of refraction substantially different from that of air.

4,586,490

NEEDLE INSERTING INSTRUMENT MEANS FOR INTERSTITIAL RADIOTHERAPY

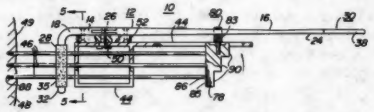
Harry R. Katz, 315 Evergreen Rd., Jenkintown, Pa. 19046

Filed Feb. 27, 1984, Ser. No. 583,585

Int. Cl.[4] A61B *17/06*

U.S. Cl. 128—1.1 **20 Claims**

1. An instrument means for concurrently inserting a plurality of hollow needles into a body for interstitial radiotherapy comprising a unit having handle means and providing clamping means for controllably alternately engaging and securing with the unit and releasing from the unit a plurality of needles which are to be inserted into a body by incremental advancements, the clamping means being released for moving the unit back along the needles after each advancement and being



clamped for further advancing the needles, and needle retaining means secured with the unit spaced from said clamping means for slidably receiving and positioning the plurality of needles while they are controllably engaged and secured with the unit and released from the unit by the clamping means of the unit during their incremental advancements.

4,586,491

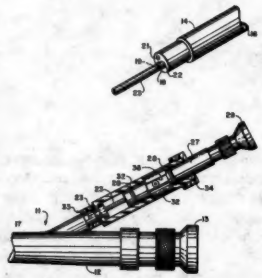
BRONCHOSCOPE WITH SMALL GAUGE VIEWING ATTACHMENT

George J. Carpenter, Southbridge, Mass., assignor to Warner-Lambert Technologies, Inc., Morris Plains, N.J.

Filed Dec. 14, 1984, Ser. No. 681,460

Int. Cl.[4] A61B *1/06*

U.S. Cl. 128—6 **4 Claims**



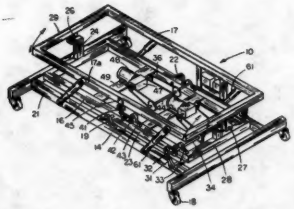
1. A bronchoscope having image and light guide fiber optic bundles for internal inspection of a bronchial tree in medical and veterinary situations comprising:

a bronchoscope shaft having an open channel of a given length extending from a distal end to a proximal end of the shaft and a catheterscope having a small diameter shaft of a greater length than said given length received in said open channel and movable within said channel beyond the distal end of the bronchoscope shaft operable to penetrate small diameter remote branches of bronchioli of the bronchial tree, said bronchoscope and said catheterscope having individual housings making a releasable connection one to the other, said catheterscope housing being tubular enclosing a piston connected to the catheterscope shaft, said piston being movable within said housing to advance and retract said catheterscope shaft relative to said bronchoscope shaft.

4,586,492
THERAPEUTIC BED

Antonio P. Manahan, 6901 N. 72nd St., Omaha, Nebr. 68122

Filed Aug. 8, 1983, Ser. No. 521,440
Int. Cl.[4] A61H *1/00*; A47C *20/04*
U.S. Cl. 128—33 6 Claims



1. A therapeutic bed, comprising:

a rectangular base frame adapted to rest on a floor;

a rectangular intermediate frame substantially centered above said base frame, said intermediate frame journaled thereto for pivoting about its lateral axis;

a rectangular upper frame adapted to support a mattress substantially centered above said intermediate frame, said upper frame journaled thereto for pivoting about its longitudinal axis;

means for selectively controlling the angle of said intermediate frame with respect to said base frame; and

means for oscillating the pivoting of said intermediate frame with respect to said base frame, which includes:

first power means, which is mounted on said intermediate frame and turns a shaft having a link pivotally and eccentrically attached thereto and is pivotally attached at its other end to said base frame; and

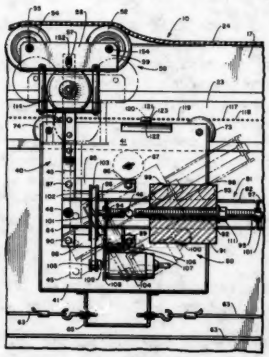
means for oscillating the pivoting of said upper frame with respect to said intermediate frame, which includes:

second power means, which is mounted on said intermediate frame and turns a shaft having a link pivotally and eccentrically attached thereto and is pivotally attached at its other end to said upper frame.

4,586,493
THERAPY TABLE

Charles J. Goodman, 2955 N. Moorpark Rd., Thousand Oaks, Calif. 91360

Filed Sep. 13, 1983, Ser. No. 531,942
Int. Cl.[4] A61H *15/00*
U.S. Cl. 128—57 12 Claims



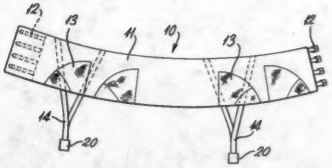
1. In a therapy table comprising a supporting surface for supporting the body of a person to be treated, body acting means at least a portion of which is below the supporting surface for acting on the body, motive means below the supporting surface for moving the body acting means relative to the supporting surface on the body, and transmitting means through the supporting means to permit the body acting means to apply force on the body, wherein the improvement comprises:

the body acting means having a counter-balance arm including a mass mounted on the arm, means attached to the arm means and the body acting means for applying the weight of the mass as an upward force on the body acting means to urge the body acting means against the body at a predetermined force, and further comprising rails on the therapy table below the supporting surface, the body acting means having a carriage and means on the carriage in contact with the rails for moving along the rails, roller means on the top portion of the carriage for rolling along the bottom of the transmitting means to exert force on the body through the transmitting means, roller mounting means on the top portion of the carriage for mounting the roller means on the carriage, the roller mounting means including an elongated slot having a greater vertical dimension that horizontal dimension, and vibration means mounted on the carriage for vibrating vertically the mounting means and the rollers, a reference surface on at least one of the rails, the reference surface having alternating reflecting and absorbing bands aligned in the direction of travel of the carriage, sensing means on the carriage for sensing the number of alternating reflecting and absorbing bands, and processor means for comparing the counted number of a reference number for determining the position of the body acting means on the therapy table.

4,586,494
ORTHOPAEDIC TRACTION DEVICES

Terence Singleton, Stretford, England, assignor to National Research Development Corp., London, England

Filed Nov. 16, 1983, Ser. No. 552,370
Claims priority, application United Kingdom, Nov. 16, 1982, 8232623
Int. Cl.[4] A61A *1/02*
U.S. Cl. 128—75 5 Claims



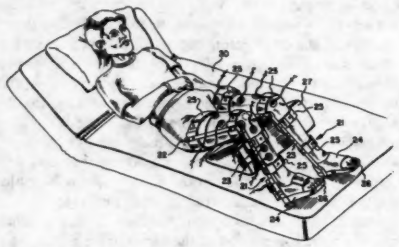
1. A pelvic belt to be worn by a patient whereby tension lines are connectable for the application of tractive force, said belt having four pocketed zones therealong, said pocketed zones being of common size and constructed to accommodate more readily to a given patient's pelvic protrusions and arranged in two pairs of alternate zones with the spacing between the zones of each pair being the same for alternate location of said pairs on the patient's hips during use, and two tension line connectors respectively located adjacent alternate ones of said zones.

4,586,495

THERAPY SYSTEM FOR ACUTE PATIENT CARE

Jerrold S. Petrofsky, Beavercreek, Ohio, assignor to Wright State University, Dayton, Ohio

Filed Jul. 2, 1984, Ser. No. 627,241
Int. Cl.[4] A61N 1/32
U.S. Cl. 128—82.1 12 Claims



1. A therapy system for a human being comprising:
a stimulation generator for generating electrical signals of muscle stimulating amplitude and waveform,
surface electrode means in electrical communication with said stimulation generator for applying said electrical signals to the skin of said human being at a location providing stimulating access to a muscle connected for causing movement of a joint of said human being,
restraining means attached to said joint for restraining movement thereof and generating a load signal corresponding to the actual load being applied to said joint by said muscle;
load selection means for selecting a target load for said muscle, and
control means in electrical communication with said stimulation generator for controlling the operation of said stimulation generator to cause alternating stimulation and resting of said muscle; said control means also being in electrical communication with said restraining means and said load selection means for periodically adjusting said stimulation in accordance with the difference between said target load and said actual load to cause isometric muscle effort at a level near the value of said target load.

4,586,496

SURGICAL CHISEL

Arnold Keller, Kayhude, Fed. Rep. of Germany, assignor to Waldemar Link GmbH & Co., Hamburg, Fed. Rep. of Germany

Filed Mar. 4, 1985, Ser. No. 707,782
Claims priority, application Fed. Rep. of Germany, Mar. 5, 1984, 8406730[U]
Int. Cl.[4] B25D 3/00
U.S. Cl. 128—92 E 5 Claims

1. A surgical chisel, comprising:
a chisel shank (3) having a first end adapted to receive the impact of a hammer;
an elongated chisel blade (2) coupled at a first end to a second end of said chisel shank and having a cutting edge at a second end; and

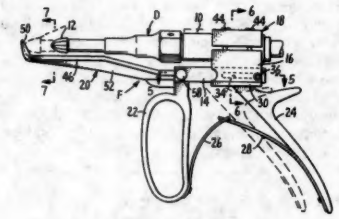
a chisel guide (7) having slideways for displaceably guiding said blade and shank in a longitudinal direction so that said guide supports and adds rigidity to said blade and shank.

4,586,497

DRILL FIXATION DEVICE AND METHOD FOR VERTEBRA CUTTING

David J. Dapra, 5501 Ambrose Dr., Reno, Nev. 89509; John B. Clementi, So. Milwaukee, Wis., and Robert J. Morelli, Reno, Nev., assignors to David J. Dapra, Reno, Nev.

Filed Oct. 31, 1983, Ser. No. 546,968
Int. Cl.[4] A61F 5/04, 17/32
U.S. Cl. 128—92 E 13 Claims



1. A device to position a high-speed rotary bone cutter relative to the bone tissue being cut, said device comprising:
a base having a first grip attached thereto;
a carrier with a fixture means for securing a rotary cutter thereto;
mounting means connecting said base and said carrier for guided relative movement therebetween;
a second grip, connected to the carrier and cooperating with said first grip to enable an operator of the device to selectively impart said movement by squeezing said first and second grips;
a foot plate fixedly connected to said base and engageable with bone tissue to be cut to place said tissue in the path of said rotary cutter between the cutter and the plate, and wherein squeezing said grips impinges said cutter on said tissue when so placed.

4,586,498

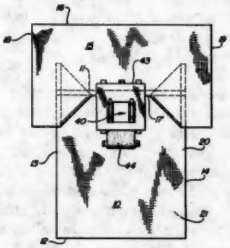
SURGICAL DRAPE WITH ARM BOARD COVER

Henrietta K. Morris, Arlington, Tex., assignor to Surgikos, Inc., Arlington, Tex.

Filed Apr. 26, 1984, Ser. No. 604,109
Int. Cl.[4] A61B 19/06
U.S. Cl. 128—132 D 5 Claims

1. A surgical drape for use with an operating table having

arm boards extending laterally therefrom, said drape comprising, when in a flat position, a generally rectangular body portion having a top edge, a bottom edge and two opposing side edges, a one-piece arm board portion having a top edge, a bottom edge and two opposing side edges and an upper surface and a lower surface, and said arm board portion being divided in width into a central area and two side areas, the bottom edge of the central area overlapping and being secured to the top edge of the body portion along a line of attachment, each of the



side areas comprising a first segment underlying the upper surface of the drape and having a part which is secured to the top edge of the body portion on a continuation of the line of attachment of the central area and a second part which is integral with a second segment, said second segment overlying the first segment and forming the upper surface of the arm board portion, said first segment capable of unfolding to conform to the junction of the operating table and the arm boards of the operating table.

4,586,499

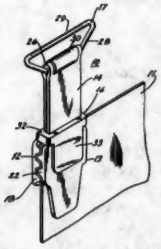
SURGICAL BANDAGE DISPOSABLE COUPLING DEVICE

Esther Kaletzky, 40 Waterside Plz., New York, N.Y. 10010

Filed Mar. 19, 1984, Ser. No. 591,273

Int. Cl.[4] A61F *13/00*; A44B *21/00*

U.S. Cl. 128—171 **11 Claims**



1. A web coupling device comprising a first pair of first clamp jaws defining soft resilient panels having opposing confronting inner gripping faces and outer faces in backing registry with respective of said inner faces and being relatively movable between a closed clamp position with said gripping faces in non-slipping engagement with a web and a separated web release position, a flexible band extending longitudinally from at least one of said jaw panels, a locking member including a slide member slidably engaging said band and including a pair of spaced confronting relatively rigid locking sections projecting longitudinally from and being longitudinally movable with said slide member between a lock position with said slide member above said outer faces and with said locking sections superimposed on and engaging said jaw panel outer faces backing said inner faces to releasably retain said jaws in their lock position sandwiching a web between said panel inner faces and a release position with said locking sections disengaged and longitudinally displaced from said jaw panel outer faces to permit the separation of said jaws, and a connector attached to said band.

4,586,500

BREATHING APPARATUS

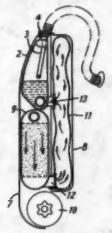
Michael H. Glynn, Heckfield, Great Britain, assignor to Sabre Safety Limited, Hampshire, England

Filed Jun. 14, 1983, Ser. No. 504,160

Claims priority, application United Kingdom, Jun. 14, 1982, 8217211

Int. Cl.[4] A62B *7/00*

U.S. Cl. 128—204.15 **9 Claims**



1. A breathing apparatus comprising:

breathing means for permitting a user to inhale a breathable gaseous medium and exhale gases;

first conduit means connected at one end to said breathing means to establish a flow path for the breathable gaseous medium to be passed to a user for inhalation;

second conduit means having one end connected to said breathing means to establish a flow path for the exhaled gases;

regeneration means operatively coupled to the other ends of said first and second conduit means and in fluid communication therewith for accepting and regenerating said exhaled gases from said second conduit means so that breathable gaseous medium is discharged into said first conduit means; and

cooling means downstream of said regeneration means for cooling said breathable medium, said cooling means including (a) a reservoir containing a predetermined volume of refrigerant liquid, a portion of said first conduit means being disposed in said reservoir in heat-exchange relationship with said refrigerant liquid, and (b) manually operable pressure relief valve means establishing fluid communication between said reservoir and the ambient environment, said valve means for permitting manual selection of a predetermined vapor pressure for the liquid refrigerant and to responsively control the temperature of the liquid refrigerant and thus the temperature of the breathable medium flowing through said first conduit means in heat-exchange relationship with said liquid refrigerant, wherein said valve means includes:

(i) a valve body defining a valve seat;

(ii) valve stem means in seated relationship against said valve seat to thus prevent fluid communication between said liquid refrigerant and said ambient environment when said liquid refrigerant exhibits a vapor pressure below said predetermined pressure yet is movable into spaced relationship with said valve seat to establish fluid communication between said liquid refrigerant and said ambient environment; and

(iii) adjustable coupling means for coupling said valve stem means and said valve body, said coupling means for adjustably determining movement of said valve stem means

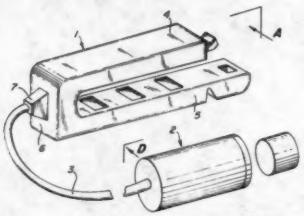
from said seated relationship to said spaced relationship relative to said valve seat to thereby responsively permit selection of said predetermined vapor pressure of said liquid refrigerant.

4,586,501

DEVICE FOR PARTLY OCCLUDING A VESSEL IN PARTICULAR THE INFERIOR VENA CAVA AND INHERENT COMPONENT OF THIS DEVICE

Michel Claracq, 17, rue de Vittel, 31300 Toulouse, France

Filed Oct. 19, 1983, Ser. No. 543,272
Claims priority, application France, Oct. 21, 1982, 82 17766
Int. Cl.⁴ A61B *17/12*
U.S. Cl. 128—325 **19 Claims**



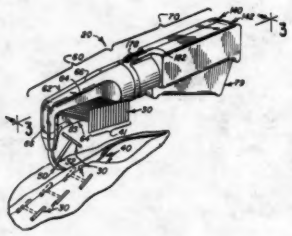
1. A device for partly occluding a vessel comprising a clip (1) having a pair of arms for straddling the vessel and being provided with teeth (d) for the purpose of partitioning the inside of the vessel into a plurality of channels, said teeth (d) being retractable, remote control means for moving said teeth between an active position wherein said projecting teeth (d) partition the vessel and a passive position wherein said teeth are withdrawn and without significant harmful effect on the vessel.

4,586,502

SURGICAL INSTRUMENT ACTUATOR WITH NON-COLLINEAR HYDRAULIC PISTONS

James J. Bedi, Stockton; Donald M. Golden, Cherry Hill, and James A. Transue, Somerville, all of N.J., assignors to Ethicon, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 345,438, Feb. 3, 1982, abandoned. This application Jul. 31, 1984, Ser. No. 636,477
Int. Cl.⁴ A61B *17/00, 17/12*
U.S. Cl. 128—334 R **2 Claims**



1. In a hand-operated surgical instrument for implanting a fastener in tissue to close a wound in the tissue, said instrument having at least one movable operating member for implanting the fastener in tissue, said operating member being disposed remote from or extending from a movable handle means for actuating said member, the improvement characterized in that a hydraulic actuating means is operably connected between said handle means and said operating member for effecting the movement of said operating member to implant said fastener when said handle means is moved relative to said instrument, said actuating means comprising:

first and second connected chambers rigidly disposed in said instrument, each said chamber having a generally cylindrical configuration and said second chamber being oriented with its longitudinal axis at an angle relative to the longitudinal axis of said first chamber;

first and second pistons slidably disposed in said first and second chambers respectively;

a substantially incompressible fluid occupying the volume within said connected first and second chambers between said first and second pistons;

means connecting said operating member with said first piston;

camming means associated with said handle means and cam follower means connected with said second piston for engaging said camming means and being moved by said handle means to force said second piston along said second chamber thereby forcing said fluid from said second chamber into said first chamber to move said first piston from a first piston to a second piston to effect said movement of the connected operating member; and

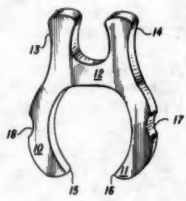
first piston biasing means for biasing said first piston from said second position to said first position.

4,586,503

SURGICAL MICROCLIP

Wolff M. Kirsch, Albuquerque, N. Mex.; Zhu Y. Hua, Shanghai, China, and Robert B. Cushman, Cedar Crest, N. Mex., assignors to University of New Mexico, Albuquerque, N. Mex.

Filed Dec. 1, 1983, Ser. No. 556,917
Int. Cl.⁴ A61B *17/04*
U.S. Cl. 128—334 R **4 Claims**



1. A surgical microclip comprising

a bridge portion, and

a pair of spaced legs extending generally parallel from opposite ends of said bridge,

a pair of ears extending generally parallel from opposite ends of said bridge in a direction opposite that of said legs, whereby said ears facilitate manipulation of said clip prior to placement and further provide means for opening said clip if removal is desired,

said clip being constructed of a biologically acceptable, plastically deformable material whereby the clip may be permanently deformed by crimping to close said legs around approximated body tissues to hole the same together, and

said legs terminating at distal tips, said tips being sufficiently rounded to avoid puncturing or otherwise injuring said tissues.

4,586,504

NERVE CONNECTOR AND METHOD

Luis de Medinaceli, Annandale, Va., assignor to Cell Medical Corporation, Hillsborough, N.C.

Filed Jun. 17, 1985, Ser. No. 745,788
Int. Cl.⁴ A61B *17/00, 17/11*
U.S. Cl. 128—335.5 **10 Claims**

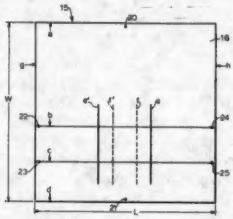
1. A method for reconnecting first and second stumps of a

transected cable-like structure in the human body, comprising the steps of:

(a) locating below the first stump of the transected structure to be reconnected a connector formed of flexible, inelastic thin sheet material and having guide-measuring lines inscribed thereon;

(b) securing a first predetermined guideline measured length of said first stump to said connector at a point removed from the tip of said stump;

(c) locating the second stump of said structure to be reconnected on said connector and securing a second predetermined guideline measured length of said second stump to said connector at a point removed from the tip of said second stump and spaced some predetermined distance



opposite from the point at which said first stump was secured;

(d) trimming a guideline measured length of tissue from the tip of each said stump to provide some third predetermined length of stump overlapping when the tip ends of said stumps are placed side-by-side, said third predetermined length corresponding to some desired amount of compression in the reconnected structure at the site of reunion of said stumps;

(e) placing said stumps in longitudinal alignment on said connector with the tips thereof in abuttment; and

(f) wrapping said connector around said structure to inhibit lateral movement of said stumps while permitting post-operative expansion.

4,586,505

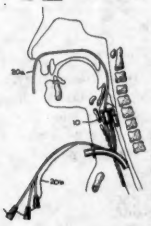
LARYNGEAL AND TRACHEAL STENT

George A. Sisson; Robert E. Berktold, both of Chicago, Ill., and Henry W. Lynch, Racine, Wis., assignors to Universal Prosthetics, Inc., Racine, Wis.

Filed May 3, 1984, Ser. No. 606,762

Int. Cl.[4] A61B *17/00*

U.S. Cl. 128—344 **4 Claims**



1. A laryngeal or trachael stent consisting essentially of a hollow cylindrical body of soft medical application material having a central bore, said body having a first inflatable retention cuff about the outer periphery of one end and a second inflatable retention cuff about the outer periphery of the other end, each of said cuffs being fluid tight and having its own pilot tube for adding or subtracting fluid, each pilot tube having a proximal end extending exterior to said hollow cylindrical body and a distal end which extends through the central bore of said body and communicates with the interior of each respective cuff, said stent further including externally extending guide means for guiding the stent into proper position in a larynx or trachea, said guide means comprises at least one string which extends through and externally out of both ends of the central bore, said string being secured to said hollow cylindrical body, and means associated with said central bore for blocking fluid flow therethrough.

4,586,506

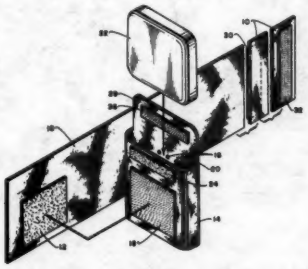
ELASTIC WRAP CONNECTING WITH HEAT OR COLD PACK

Bruce K. Nangle, 5966 Ellenview Dr., Woodland Hills, Calif. 91367

Filed Oct. 1, 1984, Ser. No. 656,185

Int. Cl.[4] A61F *7/08, 7/10*

U.S. Cl. 128—403 **2 Claims**



1. In combination with an elastic wrap, said elastic wrap being in the form of an elongated fabric strip, said wrap being capable of a limited amount of stretching, the improvement comprising:

first attaching means mounted on said wrap, said first attaching means comprising a first pad, said first pad comprising a mass of tiny eyelets;

a flexible walled container having an openable access door, said container being adapted to contain a hot or cold pack, said access door being mounted directly against said wrap to assist in preventing accidental opening of said container during the time of usage; and

second attaching means mounted on said container, said second attaching means to connect with said first attaching means thereby securing said container to said wrap, said second attaching means comprising a second pad, said second pad comprising a mass of tiny hooks, with said second pad in contact with said first pad a secure connection therebetween occurs, said second pad being disengageable from said first pad, said container is to be located against a portion of the human body and said wrap is then to be wound several times around the human body holding said container in place and providing insulation against escape of the heat or cold substance contained within said container.

4,586,507

DUAL CHANNEL CARDIAC PACER ISOLATION CIRCUIT

Harry Herscovici, Miami Beach, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Oct. 4, 1984, Ser. No. 657,971

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—419 PG **9 Claims**

1. A system for preventing cross-stimulation between the atrium and ventricle during cardiac pacing using a dual cham-

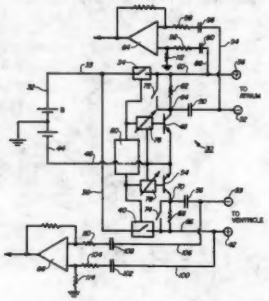
ber cardiac pacer having a battery power supply, a pacing lead connected to the atrium and a pacing lead connected to the ventricle, which comprises:

a first output capacitor connected in series with said atrium lead;

a second output capacitor connected in series with said ventricle lead;

pulse generating means operatively connected to said first output capacitor for providing a stimulus pulse through said first output capacitor to the atrium and operatively connected to said second output capacitor for providing a stimulus pulse through said second output capacitor to the ventricle;

a first switch connected between the battery power supply and said first output capacitor to prevent said first output



capacitor from being charged until said first switch is operated to provide a current flow line to said first output capacitor;

a second switch connected between the battery power supply and said second output capacitor to prevent said second output capacitor from being charged until said second switch is operated to provide a current flow line to said second output capacitor; and

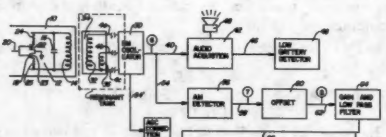
pacer logic means for controlling the operation of said pulse generating means and said first and second switches so that said first switch is operable to provide a current flow line to the first output capacitor only when a stimulus pulse is issued to the atrium and said second switch is operable to provide a current flow line to the second output capacitor only when a stimulus pulse is issued to the ventricle.

4,586,508

IMPLANT COMMUNICATION SYSTEM WITH PATIENT COIL

William P. Batina, and Lamar H. Gipson, both of Miami, Fla., assignors to Cordis Corporation, Miami, Fla.

Filed Mar. 23, 1984, Ser. No. 592,959
Int. Cl.[4] D61N 1/36
U.S. Cl. 128—419 PG **11 Claims**



1. A pacing system which comprises:

an implantable pacer having a tank circuit contained therein;

an external telemetry circuit for transmitting and receiving data to and from said pacer;

said external telemetry circuit being enclosed within a housing and including a variable frequency oscillator having a portion of a resonant tank circuit;

an inductor coil which forms another portion of said resonant tank circuit of said external telemetry circuit, said inductor coil being located outside of said housing for positioning externally on the patient in proximity to the implanted tank circuit;

electrical wire interconnecting the inductor coil and the enclosed telemetry circuit;

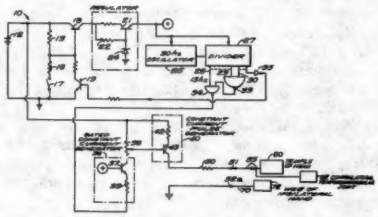
said variable frequency oscillator having means for generating a waveform that is frequency-responsive to the telemetry signals provided by the implanted tank circuit.

4,586,509

TEMPOROMANDIBULAR JOINT-MYOFASCIAL PAIN DYSFUNCTION SYNDROME TREATMENT APPARATUS AND METHODOLOGY

Saul Liss, and Bernard Liss, both of Glen Rock, N.J., assignors to Pain Suppression Labs, Inc., Elmwood Park, N.J.

Continuation-in-part of Ser. No. 569,476, Jan. 9, 1984, Pat. No. 4,550,733. This application Aug. 13, 1984, Ser. No. 640,103
The portion of the term of this patent subsequent to Nov. 5, 2002, has been disclaimed.
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—422 **3 Claims**



1. A method for suppressing pain associated with the disease temporomandibular including the steps of securing a first positive electrode on the pain site, a second positive electrode on the contra-lateral temporomandibular joint, and securing a negative electrode connected electrically in common to the web of the subject's ipsilateral hand, and supplying an electrical wave comprising a high frequency amplitude modulation to said first, and said second and third electrodes.

4,586,510

APPARATUS FOR EXERCISING A PARALYZED LIMB

Roger M. Glaser; Marcus Glaser; Steven R. Collins, and Jonathan R. Strayer, all of Dayton, Ohio, assignors to Wright State University, Dayton, Ohio

Filed Jul. 27, 1984, Ser. No. 635,314
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—423 W **10 Claims**

1. Apparatus for stimulating a paralyzed human limb to move from a rest position to a working position and thence back to a rest position comprising:

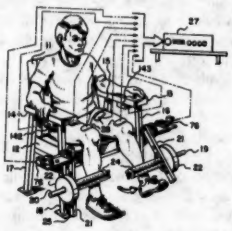
means for generating a reference signal indicating desired limb positions varying continuously from said rest position to said working position and thence back to said rest position,

a position sensor for sensing the position of said limb and generating a position signal corresponding thereto,

a differential amplifier for generating an error signal representing the difference between said reference signal and said position signal,

a stimulus integrator for integrating said error signal to produce a stimulation driving signal,

electrode means responsive to said stimulation driving signal



for stimulating muscular activity in said limb and causing aforesaid movement, and

dynamic load means for generating a force to resist said movement and cause muscular exertion in said limb.

4,586,511

METHODS AND COMPOSITIONS FOR DETECTING AND IMAGING A GAS IN AN ANIMAL BY NUCLEAR MAGNETIC RESONANCE

Leland C. Clark, Jr., Cincinnati, Ohio, assignor to Children's Hospital Medical Center, Cincinnati, Ohio

Filed Mar. 4, 1983, Ser. No. 472,229

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—653 **52 Claims**

1. A method of detecting indirectly a dissolved gas in an animal comprising

introducing into the animal an element adapted for NMR detection, said element being influenced by the dissolved gas in the animal,

subjecting the animal having the element influenced by the dissolved gas to an NMR spectrometer,

detecting a radio-frequency signal derived from the nuclear magnetic resonance of the influenced element utilized an NMR technique to obtain an NMR parameter, and

observing the NMR parameter as a function of the dissolved gas.

4,586,512

DEVICE FOR LOCALIZED HEATING OF BIOLOGICAL TISSUES

Jean-Paul Do-huu, and Pierre Hartemann, both of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 392,242, Jun. 25, 1982. This application Mar. 27, 1985, Ser. No. 717,465

Claims priority, application France, Jun. 26, 1981, 81 12612; Mar. 19, 1982, 82 04747

Int. Cl.[4] A61B *10/00*

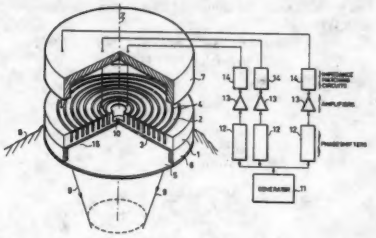
U.S. Cl. 128—660 **27 Claims**

1. A device for localized heating of biological tissues comprising:

electromechanical transducer means for projecting ultrasonic radiation, coupled to an electric excitation generator having a predetermined oscillation frequency, said transducer means being of the half-wave type and comprising a rigid plate of piezoelectric material, a first face of said plate being provided with a set of concentric annular groves of uniform pitch in the vicinity of the wavelength of said radiation in water, a second face of said plate being smooth and flat,

said plate having annular radiating zones bounded by said grooves and provided with electrodes placed in contact with said faces, each annular radiating zone describing a circle to obtain a circular radiation pattern; and

an electric excitation generator having a predetermined oscillation frequency, said generator including an array of adjustable phase-shifting means for supplying said electrodes at least partially with voltages having adjustable phases for selectively focusing said radiation into biologi-



cal tissues which are acoustically coupled with said second face, said selective focusing including moving said radiation pattern in a direction orthogonal to said plate.

4,586,513

NONINVASIVE DEVICE FOR PHOTOELECTRICALLY MEASURING THE PROPERTY OF ARTERIAL BLOOD

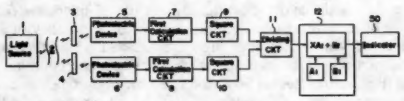
Kenji Hamaguri, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 17, 1983, Ser. No. 467,431

Claims priority, application Japan, Feb. 19, 1982, 57-26639

Int. Cl.[4] A61B *5/00, 6/00*

U.S. Cl. 128—633 **10 Claims**



1. A noninvasive device for photoelectrically measuring a property of arterial blood in living tissue comprising:

means for providing a source light to enter into living tissue, the light means remains outside the living tissue and only the light passes into the living tissue;

means for photoelectrically measuring the intensity of the source light emerging from the living tissue after contact with the arterial blood therein, at a pair of separate wavelengths, and for producing a pair of electric signals, respectively, each signal including an alternating-current component and a direct-current component;

means for calculating information from the signals representative of the relative amplitude of the alternating-current component compared to the direct-current component for each of the measured wavelengths and for producing first and second calculated outputs, respectively representing the relative amplitudes at each wavelength;

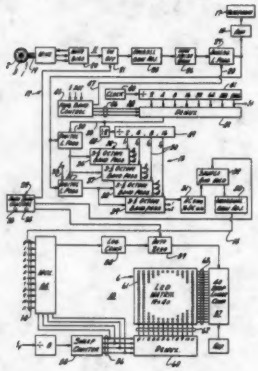
means for obtaining a final output signal that is a linear function of the square of a ratio between the first and second calculated outputs; and

means for indicating the property of the arterial blood in response to the final output.

4,586,514
PHONOANGIOGRAPHIC SPECTRAL ANALYSING APPARATUS

Kenneth J. Schlager, Elm Grove, and Jeffrey R. Melvin, Franklin, both of Wis., assignors to Biotronics Instruments, Wauwatosa, Wis.

Filed Aug. 10, 1983, Ser. No. 521,957
Int. Cl.⁴ A61B 7/00
U.S. Cl. 128—773 **13 Claims**



1. A phonoangiographic diagnostic instrument for the clinical non-invasive analysis of an internal flow passage of a living patient, and said passage adapted to include a restriction and creating a high frequency signal component on the pulse frequency signal in the passage related to the flow of blood in said flow passage and creating a complex pressure signal, comprising a sensing means adapted to be coupled to the patient to sense the flow and the pressure in said flow passage and generating a related complex electrical signal proportional to the pressure in said passage, said electrical signal including a wide spectrum of high frequencies within a known frequency range corresponding to said high frequency component of said pulse frequency signal, a spectrum filter means connected to said sensing means and including a plurality of bandpass filters, each of said filters convering an octave of a plurality of adjacent octaves within said high frequencies of said complex electrical signal to cover the full frequency spectrum related to the flow in the internal flow passage with an obstruction in said passage, conversion means connected to the output of the filter means to average the signal of each individual filter over a plurality of cycles of the pulse frequency related to the flow of blood in said flow passage and establishing a flow regulated electrical output signal, a display means coupled to said conversion means for essentially simultaneously and conjoint on-line display of the said flow related electrical output signals of said bandpass filters and thereby restriction related flow in said passage.

4,586,515
DEVICE FOR MEASURING THE POSITION AND/OR MOTION OF A BODY PART

Meinhard Berger, A-6103 Reith 55, Austria

PCT No. PCT/AT83/00009, § 371 Date Dec. 16, 1983, § 102(e) Date Dec. 16, 1983, PCT Pub. No. WO83/03534, PCT Pub. Date Oct. 27, 1983
PCT Filed Apr. 15, 1983, Ser. No. 567,402
Claims priority, application Austria, Apr. 16, 1982, A1485/82
Int. Cl.⁴ A61B 5/10
U.S. Cl. 128—782 **9 Claims**

1. A method for the diagnosis of nuerological and orthopedic motion disorders of a body part which comprises the steps of:

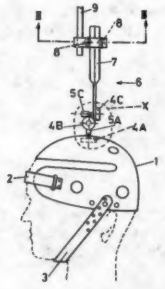
affixing to said body part a single articulation consisting of three rotary displacement sensors having mutually orthogonal axes and each consisting of two relatively rotatable members defining the respective axis such that a first member of a first of said sensors is rigidly connected to said body part, a second member of said first sensor is rigidly connected to a first member of a second of said sensors, a second member of said second sensor is rigidly connected to a first member of a third of said sensors and a second member of said third sensor is rotatable relative to said first member of said third sensor about an axis of said third sensor;

spacially positioning said second member of said third sensor by fixing it against rotation but enabling linear displacement of said second member of said third sensor while permitting pendular displacement of said axis of said third sensor with respect to a reference point in space about two pendular axes neither of which is parallel to said linear displacement of said second member;

measuring linear displacement of said second member of said third sensor with a fourth motion sensor;

measuring angular displacement of said axis of said third sensor about said reference point with fifth and sixth motion sensors respectively responsive to displacement about said pendular axis; and

causing said body part to move and detecting outputs of said sensors as an indication of the motion pattern of said body part in space to a diagnose a motion disorder.



2. An apparatus for the diagnosis of neurological and orthopedic motion disorders of a body part which comprises:

a holder adapted to be affixed to a body part, motion of which is to be monitored for diagnosis of a neurological or orthopedic motion disorder;

a sensing system forming a single three-axis articulation affixed to said holder, said sensing system comprising:

three rotary displacement sensors having mutually orthogonal axes and each consisting of two relatively rotatable members defining the respective axis,

a first member of a first of said sensors being rigidly connected to said holder,

a second member of said first sensor being rigidly connected to a first member of a second of said sensors,

a second member of said second sensor being rigidly connected to a first member of a third of said sensors and a second member of said third sensor being rotatable relative to said first member of said third sensor about an axis of said third sensor;

a longitudinally shiftable support element connected to said second member of said third sensor and restricting angular displacement of said second member of said third sensor while guiding said sensing means linearly with respect to a reference point spaced from said holder;

means for mounting said support element to permit pendular displacement of said support element about two different pendular axes neither of which are parallel to the linear

displacement of said element with respect to said reference point;

a fourth sensor responsive to linear displacement of said sensing system in the direction of said linear displacement; and

fifth and sixth sensors respectively responsive to angular displacement of said element about said pendular axes whereby outputs of said sensors can be monitored to provide an indication of motion disorders of a body part engageable in said holder.

4,586,516

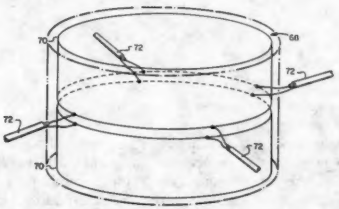
APPARATUS FOR CREATING HYPERTHERMIA IN TISSUE

Paul F. Turner, North Salt Lake, Utah, assignor to BSD Medical Corporation, Salt Lake City, Utah

Division of Ser. No. 405,947, Aug. 6, 1982, which is a continuation-in-part of Ser. No. 136,506, Apr. 2, 1980, Pat. No. 4,462,412. This application Oct. 11, 1984, Ser. No. 659,663

Int. Cl.[4] A61N *5/00*

U.S. Cl. 128—804 **3 Claims**



1. An apparatus for heating a target by irradiating the target with electromagnetic radiation, comprising:

upper and lower cylindrical radiating surfaces positioned adjacent to each other to function as a dipole antenna and forming an interior portion for location of the target therein;

means connected to said upper and lower surfaces for coupling radiation to said surfaces; and

an outer shield means surrounding the radiating surfaces for reflecting radiation and reducing outwardly emitted radiation.

4,586,517

METHOD AND APPARATUS FOR ASCERTAINING THE FILLING POWER OF TOBACCO

Waldemar Wochnowski, Hamburg, Fed. Rep. of Germany, assignor to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

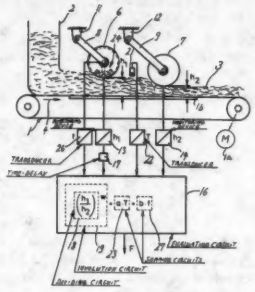
Filed Jul. 8, 1983, Ser. No. 512,160

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1982, 3228691

Int. Cl.[4] A24C *5/39*

U.S. Cl. 131—84.1 **27 Claims**

1. A method of ascertaining the filling power of tobacco which forms part of a continuous elongated stream, comprising the steps of transporting the stream lengthwise in a predetermined direction and along a predetermined path; densifying the stream in a plurality of successive portions of said path, said portions being disposed one behind the other as considered in said predetermined direction, including subjecting tobacco in said portions of the path to the action of compacting forces whose magnitude varies from portion to portion of said path whereby the stream undergoes deformation whose extent varies from portion to portion of said path; monitoring the stream in said portions of said path and generating signals whose characteristics are indicative of the extent of deformation of the stream in the respective portions of said path; and



converting said signals into a modified signal which is indicative of the filling power of tobacco forming the stream.

4,586,518

HAIR SETTING METHOD USING AMINOALKYL SUBSTITUTED POLYDIORGANOSILOXANE

Susan M. Cornwall, and Gary R. Homan, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Aug. 6, 1984, Ser. No. 637,992

Int. Cl.[4] A45D *7/00*

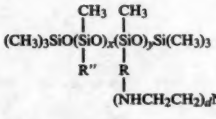
U.S. Cl. 132—7 **10 Claims**

1. A method of setting hair comprising the steps of:

(A) rolling the hair around a shaping device,

(B) moistening the hair with water,

(C) applying to the hair an effective amount of a fixative composition consisting essentially of 0.1 to 40 percent by weight of aminoalkyl substituted polydiorganosiloxane generally conforming to the formula



wherein R denotes an alkylene radical of 3 to 5 carbon atoms; R' denotes a hydrogen atom or an alkyl radical of 1 to 6 carbon atoms; each R'' denotes a monovalent radical selected independently from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, isobutyl, and phenyl; d has a value of 0, 1, 2, or 3; x+y has an average value from 50 to 1000 and the ratio of y to x has a value from 0.02 to 0.15; the aminoalkyl substituted polydiorganosiloxane being carried in an aqueous emulsion or a physiologically acceptable organic solvent, and

(D) drying the hair while the hair is rolled.

4,586,519

COMPACT CASE

David Seidler, Forest Hills, N.Y., and Harley H. Mattheis, Verona, N.J., assignor to Risdon Corporation, Naugatuck, Conn.

Filed Oct. 22, 1984, Ser. No. 663,566

Int. Cl.[4] A45D *33/00*

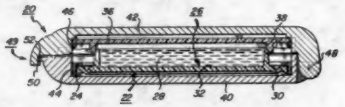
U.S. Cl. 132—83 R **18 Claims**

1. A compact case for sealingly supporting and enclosing a cosmetic preparation comprising:

a lower base including an outer support member, a receptacle for containing the cosmetic preparation, and an annular connecting member flexibly mounting said receptacle

to said support member permitting relative movement between said receptacle and said support member in both axial and radial directions, said receptacle including a platform and a first annular rim projecting from said platform, and

an upper base movable between an open position spaced from said lower base and a closed position adjacent said



lower base, said upper base including a second annular rim projecting therefrom circumferentially engageable with said first annular rim when said upper base is in the closed position, whereby said flexible connecting member provides self adjusting movement between said first and second rims to effectively seal the cosmetic preparation from the environment.

4,586,520

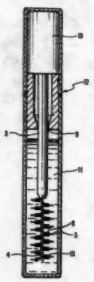
MASCARA APPLICATOR

David C. Brittain, Memphis, Tenn., assignor to Plough, Inc., Memphis, Tenn.

Filed Nov. 2, 1983, Ser. No. 548,114

Int. Cl.[4] A45D *40/25*

U.S. Cl. 132—88.7 **6 Claims**



1. An applicator for selectively combing and applying fluent mascara to eyelashes, comprising:

an elongated applicator shaft having a handle portion disposed on one end thereof and a bristle brush portion disposed on an opposite end thereof, said brush portion including alternating sets of relatively long and short bristles of which approximately 10–50% are long bristles of about 0.125 inches to 0.375 inches in length and approximately 50–90% are short bristles of about 0.125 inches to 0.185 inches in length, said sets of long bristles extending from about 20° to 75° around said shaft and said sets of short bristles extending from about 20° to 75° around said shaft, said sets curcumferentially disposed substantially parallel to said shaft or spirally disposed about said shaft with said bristles radially extending outward therefrom;

a reservoir containing fluent mascara into which said brush portion of said applicator is dipped;

a cover removably engagable with said reservoir, forming at least part of said handle portion of said shaft; and

a wiper means associated with said reservoir disposed at an inlet to said reservoir for removing essentially all fluent mascara from said sets of long bristles upon removal of said applicator from said reservoir while allowing fluent mascara to be retained on said short bristle sets;

wherein said sets of long bristles and said sets of short bristles are disposed about said shaft and are of a length sufficient to enable the wiper means to coact therewith to wipe the sets of long bristles essentially free of mascara and allow mascara to be retained on said sets of short bristles and to enable a user to selectively apply mascara with said sets of short bristles and to comb said eyelashes with the sets of long bristles.

4,586,521

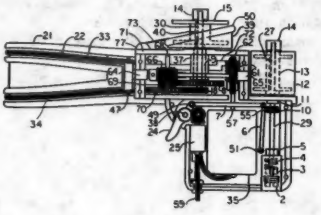
MULTI-MOTION DENTAL FLOSSER

Charles L. Urso, 215 Newton St., Waltham, Mass. 02154

Filed Dec. 7, 1983, Ser. No. 558,826

Int. Cl.[4] A61C *15/00*

U.S. Cl. 132—92 R **10 Claims**



1. A dental flossing tool comprising:

a housing;

an inner fork pivotally supported on the housing and having two tines which receive teeth to be cleaned therebetween, each tine having guides for guiding the transfer of dental floss from a distal end portion of one tine to a distal end portion of the opposite tine wherein the floss forms a movable span therebetween;

a dispensing spool rotatably supported on the housing for dispensing a strand of dental floss passing to the fork;

a take-up spool rotatably supported on the housing for retrieving dental floss passing from the fork;

means for reciprocating the fork up and down relative to the teeth;

means for producing continuous rotary motion of a drive shaft;

a speed-reduction gear train drivingly connecting the take-up spool with the drive shaft for continuous slow rotation of the spool; and

floss traversing means cooperative with the speed-reduction gears for traversing the floss across the take-up spool for level-winding to produce a continuous slow and substantially unvarying advancement of the floss strand.

4,586,522

COIN HANDLING AND SORTING

Dale L. Taipale, Delafield; John H. Winkelman, Hartland, and Thomas P. Adams, Oconomowoc, all of Wis., assignors to Brandt, Inc., Watertown, Wis.

Filed Apr. 3, 1984, Ser. No. 596,257

Int. Cl.[4] G07D *3/06*

U.S. Cl. 133—3 E **23 Claims**

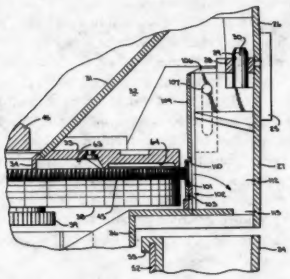
1. A coin sorter for mixed denominations of coins, comprising:

a rotatable disc having a generally planar resilient surface and a resilient peripheral edge;

means for rotating said disc;

a stationary plate spaced from said surface of said disc, said plate having a central opening so that coins may be placed flat on said disc surface, said plate having a series of guide surfaces opposing said disc and which separate and align coins carried by said disc into a single file and single layer and direct the file of coins to an exit at the periphery of said plate;

sorting stations disposed about the perimeter of said disc, one for each denomination of coin to be sorted;



a diverter for tipping coins leaving said exit from a position flat on said disc surface to a position normal to and against the peripheral edge of said disc where the coins are carried by the edge of said disc past said sorting stations.

4,586,523

CLEANING CONTROL THROUGH MEASUREMENT OF ELECTRICAL CONDUCTIVITY

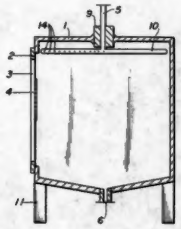
Rudolf Juenger, Kreuzau, Fed. Rep. of Germany, assignor to Akzona Incorporated, Asheville, N.C.

Division of Ser. No. 506,496, Jun. 21, 1983, Pat. No. 4,515,641. This application Feb. 1, 1985, Ser. No. 697,407

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1982, 3224016

Int. Cl.[4] B08B *9/08, 13/00*

U.S. Cl. 134—113 **17 Claims**



1. An apparatus comprising a metal vessel or pipe having exposed to the interior thereof two electrodes which are electrically insulated and separated from each other, at least one of said electrodes being exposed to contamination in said vessel or pipe, and wherein one of said electrodes comprises an inner wall of said vessel or pipe, means for flooding or turbulently impacting the interior walls of said metal vessel or pipe with a strongly alkaline or strongly acidic cleaning fluid, and conductivity measuring means conductively connected to said electrodes.

4,586,524

CLOTHES HANGER HANDLE FOR UMBRELLAS

Frank Smith, 553½ Washington St., Venice, Calif. 90291

Filed Aug. 27, 1984, Ser. No. 644,863

Int. Cl.[4] A45B *3/00;* **A47F** *5/08;* **A41D** *27/22*

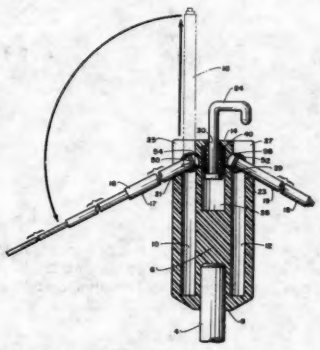
U.S. Cl. 135—16 **12 Claims**

1. A handle assembly for umbrellas or the like, said assembly comprising:

a central rod to an umbrella;

a head member adapted to attach to said central rod of an umbrella;

at least two arms pivotally mounted on said head member, each arm mounted by means of a ball joint having a ball member rotatably retained in a socket recess in said head member wherein said arms are slidably retained in a passage through said ball member to swing in their respective radial planes through arcs of about 135 degrees, from an inoperative, folded position recessed in said head member and extending generally parallel said central rod to an



operative, unfolded position by withdrawing said arms from said recessed position in said head assembly in a line generally parallel said central rod, rotating and extending said arms outwardly and away from said central rod to a predetermined angular relation to said central rod wherein said arms extend downwardly beyond a horizontal line perpendicular to said central rod and capable of acting as a hanger for clothing in this operative and unfolded position;

means attached to said head member for hanging said umbrella.

4,586,525

LARGE UMBRELLA

Adolf Glatz, and Peter Glatz, both of Frauenfeld, Switzerland, assignors to Glatz AG, Frauenfeld, Switzerland

Filed Sep. 6, 1984, Ser. No. 648,273

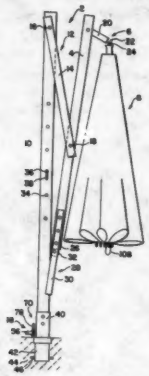
Claims priority, application Switzerland, Sep. 8, 1983, 4897/83

Int. Cl.[4] A45B *11/00*

U.S. Cl. 135—20 A **9 Claims**

1. A large umbrella arrangement, said arrangement comprising a stand having a generally vertical mast, a support arm having first and second ends, means connecting said support arm to said mast for movement relative to said mast between a retracted position at which said first end is located close to said mast and an extended position at which said first end is located remote from said mast, said connecting means including an elongated connecting member pivotally connected at one of its ends to the upper end area of said mast and pivotally connected at the other of its ends to the middle area of said support arm, said second end of said support arm engaging said mast at an adjustable heighth which adjustable heighth determines the spacing of said first end of said support arm from said mast and the inclination of said support arm from said mast, an umbrella separate in its construction from said support arm and mast and connecting member, said umbrella including opening and closing means, and means connecting said umbrella to said free end of said support arm and cooperating with said opening and closing means of said umbrella whereby when said umbrella is closed said umbrella is suspended from said free end of said support arm and may be detached from said support arm by

bodily movement of said umbrella relative to said support arm and when said umbrella is open said umbrella is rigidly fixed to



said support arm so that the angle of said umbrella relative to a vertical line may be varied by varying the heighth of said second end of said support arm relative to said mast.

4,586,526

ARRANGEMENT FOR CONTROLLING COMMUNICATION BETWEEN A TUBULAR MEMBER AND AN INFLATABLE ELEMENT SUPPORTED ON THE TUBULAR MEMBER IN A WELL BORE

Daniel R. Reardon, Houston, Tex., assignor to N. J. McAllister Petroleum Industries, Inc., Canada

Continuation of Ser. No. 553,095, Nov. 18, 1983, abandoned. This application Sep. 18, 1985, Ser. No. 778,280

Int. Cl.[4] E21B *33/127*

U.S. Cl. 137—70 **26 Claims**

1. An arrangement for controlling fluid communication between the interior of a tubular member and the interior of an inflatable element supported externally on the tubular member, comprising:

a. a tubular member and a valve housing means adapted to be supported on the tubular member;

b. there being bore means in said valve housing means;

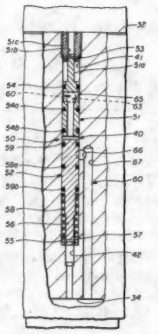
c. passage means in the tubular member and in said valve housing means for communicating fluid from the interior of the tubular member through the bore means to the interior of the inflatable element to inflate it;

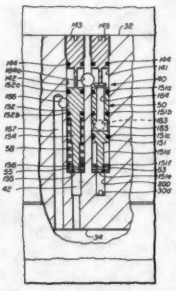
d. first valve means in said bore means for controlling fluid flow into the bore means, said first valve means having a first portion exposed to a pressure of an annulus surrounding said tubular member, and having a flow pathway for communicating flow from the interior of the tubular member through a second portion of said first valve means and into said bore means, said first valve means disposed in said bore means in an open configuration so that flow may be communicated from said passage means through said pathway of said first valve means and into said bore means;

e. second valve means in said bore means for controlling fluid flow from the bore means to an inflatable element, said second valve means having a first portion in communication with flow from the second portion of said first valve means and a second portion in communication with an external pressure from said element;

f. means to retain said second valve means in a closed position in said bore means to close off flow to the inflatable element until a first predetermined pressure differential is reached in said bore means, and for releasing said second valve means so that it may move to an open position and communicate said bore means for flow to the interior of the inflatable element when the first predetermined pressure differential is reached, said means for releasing said second valve means including pressure responsive means so that said second valve means moves to its open position responsive to a higher pressure in said bore means acting on the first portion of said second valve means and a lower pressure from said element acting on the second portion of said second valve means;

g. means to retain said first valve means in an open position in said bore means to accommodate flow to said bore means until a second predetermined pressure differential between the pressure in said bore means and said pressure of the annulus, which is higher than said first predetermined pressure, is reached in said bore means, and for releasing said first valve means to move to a closed position and close off flow to said bore means when the sec-





ond predetermined pressure differential is reached, said means for releasing said first valve means including pressure responsive means so that said first valve means closes in response to a pressure differential between a higher pressure in said bore means between the portions of said first and said second valve means acting of the second portion of said first valve means and a lower pressure in the annulus acting of the first portion of said first valve means; and

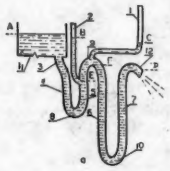
h. means for moving said second valve means to its closed position in said bore means and close off flow to an inflatable element, said means for moving said second valve means to its closed position including pressure responsive means so that said second valve means closes in response to a pressure differential between a higher fluid pressure from said inflatable element and a lower fluid pressure in said bore means.

4,586,527

GAS-PLUG TYPE VALVE

Iosif Baumberg, 54 Bay 29 St., Brooklyn, N.Y. 11214

Filed Apr. 30, 1984, Ser. No. 605,132
Int. Cl.[4] F16L *43/00*
U.S. Cl. 137—139 1 Claim



1. A valve, comprising

a flow-through pipe having inlet and outlet ends for flowing a liquid from the former to the latter, four substantially rectilinear pipe sections with substantially vertical axes, and three U-shaped curved interconnecting pipe sections connecting said substantially rectilinear sections with one another and including two outer curved interconnecting pipe sections spaced horizontally from one another and having a downward convexity and a middle interconnecting pipe section having an upward convexity;

a pipe for introducing locking pneumatic control signals having an upper end which is open for introducing said locking pneumatic control signals into the same, and a lower end which is connected with said flow-through pipe in a point located somewhat lower than an uppermost point of said middle interconnecting pipe section so that when a locking pneumatic control signal in form of a portion of gas is supplied through said pipe for introducing locking pneumatic control signals into said flow-through pipe the portion of gas which forms said locking pneumatic control signal is located in said middle interconnecting pipe section so as to reduce or interrupt a flow of liquid through the valve and is separated from said lower end by the liquid for preventing a backflow of the gas portion into said pipe for introducing locking pneumatic control signals after termination of supply of the locking pneumatic control signal in form of the portion of gas; and

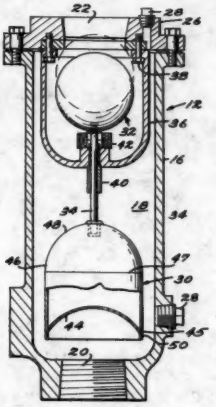
a pipe for introducing starting pneumatic control signals and having an upper end which is open for introducing said starting pneumatic control signals into the same, and a lower end which is connected with the uppermost point of said middle curved interconnecting pipe section so that the gas portion located in said middle curved interconnecting pipe section can be removed from said middle curved interconnecting pipe section under the action of said starting pneumatic control signal and therefore the liquid can again resume its initial flow through the valve, said pipe for interconnecting said starting oneumatic control signals being capillary pipe so that the liquid does not flow out of said pipe for introducing starting pneumatic control signals when the gas portion is present in said middle curved interconnecting pipe section, and said pipe for introducing starting pneumatic control signal having a a horizontal pipe portion for preserving a portion of liquid therein and closing the gas portion in said middle curved interconnecting pipe section from above by the portion of liquid, and a vertical pipe portion for producing a liquid pressure preventing emptying of said pipe fpr introducing starting pneumatic control signals from the liquid during pressure increase of the gas in said flow-through pipe.

4,586,528

AIR RELEASE VALVE

Lewis B. Andres, Bloomingdale; Robert L. Esvang, Schaumburg, and Ralph N. Di Lorenzo, Rolling Meadows, all of Ill., assignors to APCO Valve and Primer Corporation, Schaumburg, Ill.

Filed Mar. 5, 1985, Ser. No. 708,481
Int. Cl.[4] F16K *33/00*
U.S. Cl. 137—202 7 Claims



1. In a fast-operating air release valve operable to be normally open to release air from a liquid transport system and to close automatically to prevent spillage of liquid when pressure surges in the liquid in the system or other system malfunction tend to force liquid to flow through said valve, said valve being of the kind including a housing having a bottom wall provided with an inlet opening adapted to be connected to said system, said housing also having a discharge opening above the level of said inlet opening, a float buoyant with respect to liquid of the system arranged in the casing such that liquid entering the casing through said inlet and rising in the casing surrounds said float and causes the same to rise; and movable closure means operatively associated with said float and with said discharge opening such that rising of said float moves said closure means into closing relationship with said discharge opening, the improved float construction wherein said float has a bottom wall located above said inlet opening, said bottom wall when viewed in vertical section having a continuously curved downwardly facing concave impact surface of such concavity and area that liquid entering through said inlet opening and striking said concave impact surface causes said float to move upwardly to close said discharge opening in a shorter time period than occurs by float buoyancy alone.

4,586,529

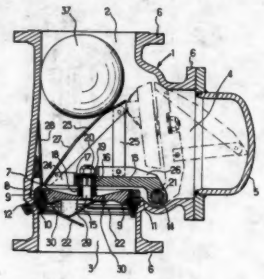
BALL LAUNCHER FOR STANDARD TUBE FOR MONITORING A VOLUME METER

Jacques M. Mocquart, La Varenne, and Alain Y. Dang, Suresnes, both of France, assignors to Societe des Transport Petroliers par Pipe-Line, Paris, France

Filed Jul. 12, 1984, Ser. No. 630,248
Claims priority, application France, Jul. 21, 1983, 83 12060
Int. Cl.[4] G01F *25/00*
U.S. Cl. 137—268 6 Claims

1. In a sphere or ball launcher for a standard tube for monitoring volume meters, adapted to transfer a ball from the outlet end of a pipe loop to its inlet end, constituted by a body having a first opening for receiving said ball from the outlet end of said pipe loop, a second opening for introducing the ball into the inlet of said pipe loop, and a side chamber located between said first and second openings, a valve within said body which is

fixed with respect to rotation with a pin located at a distance from said valve and parallel to its plane, said pin moving said valve inside the body between a first end position and a second end position, a valve seat positioned within said body, said valve body hermetically applied against said seat in said first end position, and allowing the ball, the diameter of which is slightly larger than the interior diameter of said seat, to move by gravity inside said body, and abut said seat when said valve



is in said second end position, said valve in said second end position being located in said side-chamber, the return of said valve to its first end position ensuring forced passage of the ball through said seat, the improvement comprising a deflector in the form of a ramp positioned on said valve on a face opposed to said seat, on which the ball abuts in the first end position of said valve, and on which the ball rolls when said valve moves to its second end position.

4,586,530

ARRANGEMENT FOR SUPPLYING OF CONSUMERS WITH PRESSURE FLUIDS

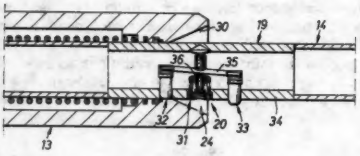
Peter Heintzmann, Bochum; Manfred Koppers, Duisburg; Karlheinz Bohnes, Bochum, and Rolf-Peter Smektala, Marl, all of Fed. Rep. of Germany, assignors to Bochumer Eisenhutte Heintzmann GmbH & Co. KG, Bochum, Fed. Rep. of Germany

Filed Nov. 13, 1984, Ser. No. 671,431

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1983, 3340815

Int. Cl.[4] F16K *43/00*

U.S. Cl. 137—322 **11 Claims**



1. An arrangement for supplying consumers, particularly mobile consumers, with pressure fluids such as pressure air or pressure liquid, preferably in undergound excavations, comprising a rail track arranged to guide a pressure fluid and having a longitudinal axis; a plurality of nipples arranged on said rail track at a plurality of locations spaced from one another by predetermined distances in a longitudinal direction of said rail track; at least one fluid withdrawing unit movable on said rail track and cooperating with said nipples so as to open the latter, said fluid withdrawing unit having a length which is selected with respect to the distance between two of said nipples so that one of said nipples is always located in the region of said withdrawing unit so as to provide automatic opening of said nipple; and a plurality of pairs of plungers each associated with a respective one of said nipples and each having two plungers which are spaced from one another in the longitudinal direction of the rail track, connected with one another in a scale balance-like manner, and extending beyond a periphery of said rail track, each of said plungers being formed to act on the respective one of said nipples so as to unlock the latter.

4,586,531

VALVE ARRANGEMENT

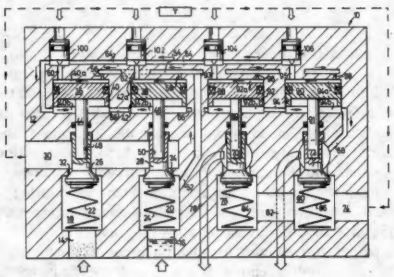
Curt O. Lindell, Täby, Sweden, assignor to Toolex Alpha AB, Sundbyberg, Sweden

Filed Sep. 21, 1984, Ser. No. 653,060

Claims priority, application Sweden, Sep. 22, 1983, 8305124

Int. Cl.[4] F16K *31/122*

U.S. Cl. 137—334 **3 Claims**



1. A valve arrangement for supplying alternately a heating medium, preferably steam, and a coolant, preferably water, to at least one compression moulding tool connected to the valve arrangement, said arrangement comprising:

a valve-housing body having arranged therein a heating-medium inlet passage and a coolant inlet passage, which open into a mutually common outlet passage connected to said compression moulding tool;

an inlet valve located between a respective inlet passage and said common outlet passage, said inlet valves being biased towards a respective valve seat;

auxiliary devices each arranged to co-act with a respective one of said inlet valves in a manner to open said inlet valves alternately, each of the auxiliary devices comprises a hydraulic piston mounted in the valve-housing body and arranged to act upon a respective inlet valve in a valve opening direction via a piston rod;

a bypass extending between said coolant inlet passage and said auxiliary devices so as to communicate in common with a first cylinder space located on one side of the respective hydraulic pistons, each of said cylinder spaces in turn communicating with a second space located on the other side of the respective pistons via a return-flow passage;

a pilot valve coordinated with the respective auxiliary device arranged to alternately close off the return-flow passage from the respective auxiliary device; and

an outlet passage conducting the coolant leaving the second cylinder spaces away from the valve arrangement.

4,586,532

LIQUID LEVEL ACTUATOR

Ilias Tsolkas, 2813 Longview Dr., Clearwater, Fla. 33519

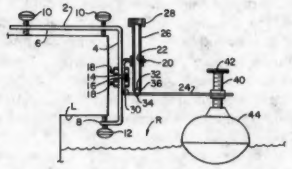
Filed Jul. 31, 1985, Ser. No. 760,966

Int. Cl.[4] F16K *31/18, 33/00*

U.S. Cl. 137—426 **2 Claims**

1. An apparatus for sensing changes in liquid level in a reservoir and adjusting flow of liquid into said reservoir to maintain

said level at a selected height, said apparatus comprising a base member adapted for connection to a lip portion of a wall of said reservoir, said base member comprising a generally U-shaped member having a base portion, an upper leg portion, and a lower leg portion, each of said leg portions being provided with threaded holes, upper and lower screws disposed, respectively, in said upper and lower leg portions and extending toward upper and lower surfaces, respectively, of said lip portion to connect said base member to said lip portion, a bracket fixed to said U-shaped member, said bracket comprising a wall portion adjacent said base member base portion and a retaining portion extending outwardly from said wall portion and having an opening therethrough, a vertical conduit member disposed in said retaining portion opening and being retained therein, a connector portion disposed at an upper end of said conduit member and adapted to receive a liquid delivery



hose, a lower end of said conduit member comprising an outlet for flow of liquid therefrom into said reservoir, an arm hingedly mounted on said bracket proximate said conduit member lower end, a stopper fixed to said arm and arcuately moveable between a first position in which said stopper is adjacent said outlet and partially disposed within said outlet, whereby to close said conduit member outlet, and a second position in which said stopper is removed from said conduit member outlet, and a flotation body fixed to a free end of said arm and adapted to be engaged by the surface of said liquid in said reservoir, and further adapted to move arcuately to a position beneath the lower surface of said lip and a lower surface of said base member lower leg portion, said arm being moveable between a first portion in which said arm is substantially horizontal to a second position in which said arm is substantially vertical.

4,586,533

NON-FLOWING MODULATING PILOT OPERATED RELIEF VALVE

Robert F. Estes, Foxboro, Mass., assignor to Crosby Valve & Gage Company, Wrentham, Mass.

Filed Jul. 1, 1985, Ser. No. 750,895
Int. Cl.[4] F16K *31/122*
U.S. Cl. 137—488 **6 Claims**

1. A pilot operated pressure relief valve system having, in combination,

a relief valve having a seat communicating between an inlet and an outlet,

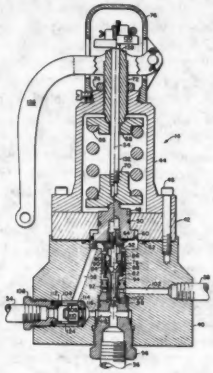
a relief valve disc closable on the seat,

a dome adapted to cause a pressure therein to apply a closing force to the valve disc,

a pilot valve body forming a channel, portions of the channel respectively forming a chamber and an exhaust seat respectively communicating with the inlet and the dome, said body having an exhaust passage communicating with the dome through the exhaust seat,

a sleeve movable in the channel and having an exhaust valve disc closable on the exhaust seat and a flow passage extending through an inlet seat and the exhaust valve disc, the flow passage having one end in communication with the chamber and the other end in communication with the dome,

a control stem having a first portion forming a wall of the chamber movable axially of the channel in response to pressure changes in the chamber and a second portion forming an inlet valve disc closable on the inlet seat in the direction away from the exhaust seat, and



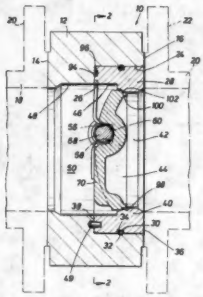
means for applying a predetermined force to the control stem in opposition to the pressure force in the chamber.

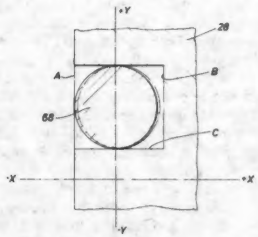
4,586,534

CHECK VALVE MECHANISM

Michael D. McNeely, Katy, Tex., assignor to Daniel Industries, Houston, Tex.

Filed Apr. 23, 1984, Ser. No. 602,827
Int. Cl.[4] F16K *15/03*
U.S. Cl. 137—515.7 **17 Claims**





1. A check valve mechanism, comprising:

(a) body means of generally circular form defining a flow passage and defining an annular seat recess, an annular seat insert being disposed within said seat recess and hav-

ing internal generally circular seat means forming a portion of said flow passage, said body means having a substantially horizontal center-line forming an X-axis and defining a Y-axis oriented in normal relation with X-axis, said annular seat insert further having opposed hinge pin receptacles of generally rectangular form with independently controlled X-axis hinge pin locating surface means and Y-axis hinge pin locating surface means, said hinge pin receptacles being eccentrically located with respect to the intersection of said X and Y axes;

(b) a hinge pin extending transversely of said flow passage and having end portions thereof located within said hinge pin receptacles with the center-line thereof substantially coincident with said Y-axis and offset from said X-axis; and

(c) a check valve disc being movably positioned within said flow passage and forming hinge bushing means eccentrically located relative to the intersection of said X and Y axes, said hinge pin being received in loose fitting linearly and pivotally movable relation within said hinge bushing means, said hinge pin being of less dimension than said hinge pin receptacles in one axial direction permitting linear movement of said hinge pin within said hinge pin receptacles said check valve bushing means being rotatable about said hinge pin, thus permitting said check valve disc to have components of rotary and linear movement relative to said hinge pin and seat means during both opening and closing movement.

4,586,535

SOLENOID VALVE UNIT

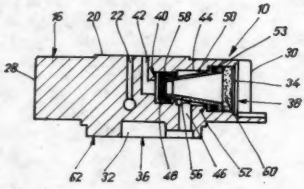
Kurt Stoll, Lenzhalde 72, D-7300 Esslingen, Fed. Rep. of Germany

Filed Nov. 18, 1983, Ser. No. 553,059

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1982, 3243199

Int. Cl.[4] F15B *13/043, 13/044*

U.S. Cl. 137—596.17 **11 Claims**



1. An electromechanically controllable valve unit for the supply of pressure medium to, and the discharge of pressure medium from a load, which valve unit is controllable by a solenoid device having a valve pocket (12) with a valve seat (20), said valve unit comprising: a valve housing (10) having an upper side forming said valve seat (20) and at least a portion of said valve pocket (12); said housing having a first surface bore therein defining a pressure port (26), a second surface bore defining a load port (36) adapted for connection to a load, and a third surface bore defining a pressure relief port (38) for a release of pressure from the load, two of said first, second and third bores being axis-parallel to each other; said housing having a first flow duct (22) therein extending between said valve seat and said pressure port, a second flow duct (42) therein extending between said valve seat and said pressure relief port, and a cross duct (46) therein extending between said pressure relief port and said load port, said third bore defining said pressure relief port having a base (40) through which said second flow duct extends; a hollow conical insert (50) pressure-tightly seated in said third bore having an outer tapered surface spaced inwardly of said third bore, and facing said cross duct (46), and an inner tapered surface with an inner small diameter open end (54) facing and spaced from said base (40) of said third bore, and an opposite large diameter open end (53), said third bore having a seal seat (52) against which said large diameter end (53) is sealingly seated, said large diameter open end facing and spaced from an open end of said third bore; a valve plate (48) movably mounted in said third bore for movement between said base and said inner small diameter end for movement into a first position against said base (40) for closing said second flow duct (42) and into a second position against said inner small diameter end (54) for closing said hollow conical insert, said valve plate having an outer annular lip (58) extending away from said base (40) for permitting the passage of pressure medium therearound with said valve plate in its second position and for being resiliently displaced outwardly against said third bore in its first position so that pressure medium entering said first flow duct to said seat flows through said second flow duct to move said valve plate into its second position and past said valve plate into said cross duct and to said load port, and with flow of pressure medium between said first and second flow ducts blocked, a flow path for pressure medium extending from said load port through said cross duct to move said valve plate into its first position for the passage of pressure medium into said inner small diameter end of said conical insert and out said pressure relief port through an interior of said hollow insert; said first and third surface bores forming said pressure port and said pressure relief port respectively are on different surfaces of said housing; and a disk shaped damping filter (60) extending across said outer large diameter open end and against said conical insert (50) in said third bore and being recessed from an outer surface of said housing for resisting medium flow through said pressure relief port.

4,586,536

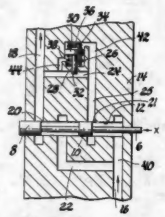
FLOW CONTROL VALVE

Amir Karmel, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 514,666, Jul. 18, 1983, abandoned. This application Dec. 17, 1984, Ser. No. 682,746

Int. Cl.[4] F16K *17/26*

U.S. Cl. 137—599 **1 Claim**



1. A flow control valve having an inlet, an outlet, varibale dual primary orifice means for connecting said inlet to said outlet through a pair of primary orifices that are connected in parallel with each other and have flow areas that are variable from zero and in the same proportion to each other, and pressure compensating secondary orifice means for providing a variable secondary orifice that is connected in parallel with one of said primary orifices and in downstream series relationship with the other primary orifice, and whose flow area is partially open at a predetermined nominal pressure gradient between said inlet and outlet and closes or opens gradually as the pressure gradient increases or decreases, respectively, so as to cause said one primary orifice to provide coarse flow regulation while said secondary orifice in conjunction with said other primary orifice provides fine flow regulation all over a finite flow range from zero to thereby reduce the sensitivity of the flow through the valve to pressure gradient variations across the valve so as to minimize flow deviations from a nominal

flow level within said finite flow range down to zero throughout a substantial pressure gradient range.

4,586,537

EMERGENCY DISCONNECTOR FOR FLUID LOADING AND UNLOADING LINES

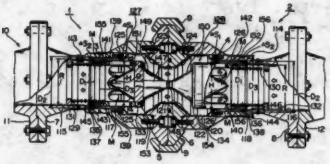
Susumu Takahashi, Niigata, Japan, assignor to Niigata Engineering Co., Ltd., Tokyo, Japan

Division of Ser. No. 444,092, Nov. 24, 1982, Pat. No. 4,512,369. This application Sep. 11, 1984, Ser. No. 649,334

Claims priority, application Japan, Feb. 26, 1982, 57-25780[U]; Apr. 13, 1982, 57-60337

Int. Cl.⁴ F16L *29/00*

U.S. Cl. 137—614.04 **4 Claims**



4. An emergency disconnector for a fluid loading and unloading line, comprising; a pair of couplings each having a fluid passage, a pair of slide valves axially slidably movable within said couplings and being normally held apart from one another to establish a continuous fluid path through said couplings, a pair of enclosing rings each extending inwardly from an inner wall of a respective coupling and defining a first restrictor gap between the enclosing ring and a respective slide valve, said slide valves each being axially movable within a respective enclosing ring and including a guide ring mounted thereon and extending radially outwardly of the body of the slide valve for defining a second restrictor gap between the guide ring and an inner wall of its respective coupling and a valve head, and sealing means surrounding said valve heads and extending outwardly therefrom, said sealing means comprising at least one circumferential element capable of exhibiting substantial resiliency at extremely low temperatures, and being movable into sealing abutment with an inner surface of said fluid passage.

4,586,538

SPINDLE VALVE FOR A TUBE SYSTEM FOR LIQUIDS

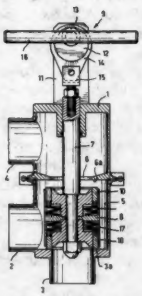
Erkki P. Niskanen, Helsinki, Finland, assignor to Erkki Niskanen Oy, Helsinki, Finland

Filed May 9, 1984, Ser. No. 608,571

Claims priority, application Finland, May 10, 1983, 831615

Int. Cl.⁴ F16K *11/044, 25/00, 31/524*

U.S. Cl. 137—625.5 **6 Claims**



1. A spindle valve for a pipe system for liquids comprising a frame provided with an inlet connection and at least one outlet connection and a valve chamber separating said connections from each other, a spindle mounted axially slidable and non-rotating within the frame, a valve member axially fixed at one end of the spindle, a closing surface formed in the valve chamber cooperating with the valve member for closing the outlet connection, an actuating means for displacing the spindle and valve means between a fixed closed position against the closing surface and an open position spaced from the closing surface, said actuating means preventing axial movement of the spindle and the valve member when in the closed position, the valve member being further provided with an axially mounted spring biased sealing ring which when the valve member is in the closed position engages the closing surface, the inner diameter of said sealing ring corresponding to the inner diameter of said closing surface.

4,586,539

FLOW ADJUSTING VALVE AND DIE CASTING MACHINE INCORPORATING THE SAME

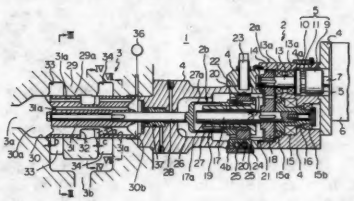
Toyoaki Ueno, Yoshiki, Japan, assignor to UBE Industries, Ltd., Japan

Filed Jan. 4, 1983, Ser. No. 455,512

Claims priority, application Japan, Jan. 5, 1982, 57-000022[U]; Nov. 16, 1982, 57-199708; Nov. 16, 1982, 57-199709

Int. Cl.⁴ F16K *31/04, 3/26*

U.S. Cl. 137—625.38 **7 Claims**



1. A spool-type flow adjusting valve comprising:

a valve body having a flow inlet and a flow outlet for transferring a pressurized fluid within said valve;

A valve bore formed within said valve body to communicate with said flow inlet and said flow outlet and having a first and a second chamber at opposite ends of said valve bore, said flow inlet being connected to said first chamber;

a valve spool slidably positioned within said valve bore and maintaining frictional engagement therewith, said valve spool having a cylindrical rod for slidably positioning said valve spool along the axis of said rod between said first and said second chambers, the surface area of said valve spool facing said first chamber being greater than the surface area of said valve spool facing said second chamber, the opening and closing of said flow outlet being dependent upon the reciprocating movement of said valve spool within said valve bore;

means for slidably positioning said cylindrical rod; and

at least one flow passage formed within said valve spool for interconnecting said first and second chambers, said flow passage being defined by a through-hole formed along the length of said valve spool, wherein the flow of the fluid passing between said flow inlet and said flow outlet increases as said valve spool moves in the direction of said second chamber and opens said flow outlet; and

a groove between the outer surface of said valve spool adjacent said valve bore and said flow passage for allowing the fluid to flow from said flow passage and into said flow outlet when said groove is aligned with said flow outlet, and wherein said flow outlet includes first and second channels extending substantially perpendicular to the axis of said valve spool, said first channel being in fluid communication with said first chamber and said second

channel for fluid communication with said flow outlet when said groove is aligned with said second channel, each of said first and second channels having a circumferential cut-out section along said valve bore for communicating said fluid from said first chamber to said first and second channels when said cut-out sections are uncovered by movement of said valve spool, and wherein the difference between the surface area of said valve spool facing said first chamber and the surface area of said valve spool facing said second chamber produces a pressure differential at the opposing surfaces of said valve spool for generating thrust forces for positioning said valve spool within said valve bore.

4,586,540

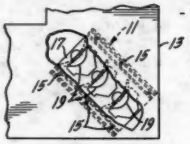
AIR TURNING VANE ASSEMBLY

Ernest P. DeLord, 200 Pine St., Prospect Heights, Ill. 60070

Filed May 15, 1984, Ser. No. 610,630

Int. Cl.⁴ B21D *39/00*

U.S. Cl. 139—39 **3 Claims**



1. An air turning vane assembly for installation in an air duct, the vane assembly including;

a pair of elongated planar sheet metal rails positioned in parallel facing relation to each other;

each elongated rail having a plurality of upstanding tabs located along the length thereof with each tab formed by a partially cutout portion of the rail and bent along a fold line formed in the rail to extend generally at right angles the plane of the rail and toward the other rail;

a tool cutout formed in each rail at each tab;

a plurality of vanes extending between the rails;

each vane having at least one curved wall, each end of which is disposed adjacent a tab on one of the opposing rails, and

a portion of the end of the wall of each vane adjacent each tab cut to form an integral ribbon rolled into a locking clip with bent over tabs adjacent each side of said integral ribbon, said clip and said bent over tabs engaging said tab to securely fasten each vane to a rail.

4,586,541

WEAVING ROTOR

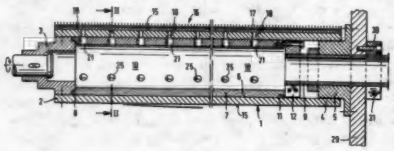
Alois Steiner, Rieden, Switzerland, assignor to Sulzer-Ruti Machinery Work Ltd., Ruti, Switzerland

Filed Nov. 27, 1984, Ser. No. 675,234

Claims priority, application European Pat. Off., Dec. 1, 1983, 83112064.7

Int. Cl.⁴ D03D *47/30*

U.S. Cl. 139—435 **9 Claims**



1. In combination,

a rotor for a pneumatic weaving machine having a plurality of radial bores disposed on a first generatrix;

at least one picking comb mounted on said rotor and including a plurality of relay nozzles aligned with said bores for receiving compressed air therefrom; and

a stationary control tube mounted within said rotor, said control tube having a first row of radial bores disposed therein along a helix offset from and circumferentially aligned with said bores in said rotor, the first bore of said control tube being circumferentially spaced from the last bore of said control tube over an arc length equal to an angle of engagement of a warp around said rotor.

4,586,542

RETURN DEVICE FOR THE PROJECTILE OF A GRIPPER PROJECTILE WEAVING MACHINE

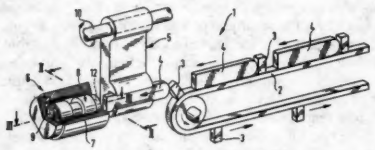
Hans Demuth, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 14, 1984, Ser. No. 589,544

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1983, 3309145

Int. Cl.⁴ D03D *51/18*

U.S. Cl. 139—439 **12 Claims**



1. A return device for projectiles of a gripper projectile weaving machine, said device including

an end position brake having a cylinder, a piston guided within said cylinder to move from an initial position thereof upon impact of a projectile thereon and a braking and restoring device in said cylinder for returning said piston to said initial position, said piston having a mass relative to a projectile mass to cause the projectile to come to a stop immediately on impact upon striking said piston in said initial position.

4,586,543

DEVICE FOR THE ROTATIONAL DRIVE OF A WEFT PREFEED AND MEASUREMENT APPARATUS IN A SHUTTLE-LESS WEAVING MACHINE

Michel Volland, Bourgoin Jailleu; Roger Fourneaux, La Tour du Pin, and Pierre Rémond, Bourgoin Jailleu, all of France, assignors to Saurer Diederichs (Societe Anonyme), Bourgoin Jailleu, France

Filed Jun. 25, 1984, Ser. No. 623,978

Claims priority, application France, Jul. 7, 1983, 83 11843

Int. Cl.⁴ D03D *47/36*

U.S. Cl. 139—452 **5 Claims**

1. In a device for the rotational drive of weft prefeed and measurement devices, in a shuttle-less weaving machine which comprises a weft selector enabling a selected one of a plurality of weft threads supplied from respective lateral weft stores to be inserted at will, with a respective prefeed and measurement device having a rotary finger which stores a predetermined length of weft thread in a cyclical manner disposed in the path of each weft thread, the improvement which comprises:

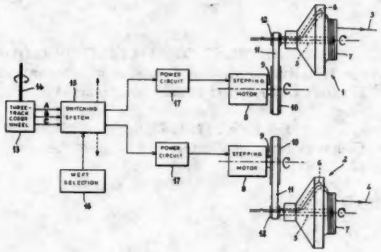
for each weft prefeed and measurement device, an electric motor having a controlled angular position having its output shaft coupled to the shaft of the prefeed and measurement device;

a control assembly comprised of electronic power circuits associated with said electric motors;

means for detecting the angular position of the main shaft of

the weaving machine and for translating this position into electrical signals; and

means which can be switched by a weft selection control of the machine and adapted to process the electrical signals supplied by said detecting means, by supplying them to the power circuits associated with the electric motor of the selected prefeed and measurement device, the means for detecting the angular position of the main shaft of the weaving machine and for translating this position into electrical signals comprising a coder wheel which is rotationally coupled to the said main shaft and comprises three concentric circular tracks, with a first track comprising unequally spaced divisions and provided such that each



angular interval between two successive divisions corresponds to a basic rotation of a motor during an acceleration stage of the prefeed device associated therewith, with a second track comprising equally spaced divisions for the control of the rotation at a constant speed of a prefeed device and with a third track comprising unequally spaced divisions and provided such that each angular interval between two successive divisions corresponds to a basic rotation of a motor during a deceleration stage of the prefeed device associated therewith, the signals produced by these three tracks being transmitted to the means which may be switched from the weft selection control and are designed to supply the signals to the power circuits.

4,586,544

DEVICE FOR CUTTING AND BENDING LEAD WIRES

Hiroshi Yagi; Yoshio Harada, and Tetsuro Ito, all of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Jul. 9, 1984, Ser. No. 628,834

Claims priority, application Japan, Aug. 1, 1983, 58-118617[U]

Int. Cl.⁴ B21F *1/00*

U.S. Cl. 140—105 **5 Claims**

1. A device for cutting and bending lead wires, comprising:

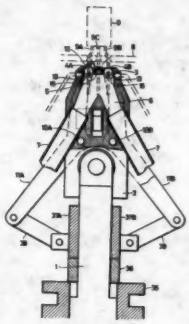
a linearly reciprocable main shaft;

a fixed block fixedly mounted on said main shaft, said fixed block having side surfaces, a distal end and a stationary blade provided at said distal end;

said stationary blade having two side holes and a central hole interposed between said side holes formed therethrough;

a pair of side levers slidably connected at one end thereof to said main shaft so as to be slidable with respect to said main shaft, said side levers being respectively pivotally mounted on both of said surfaces of said fixed block, said side levers each having a laterally movable blade member provided at the other end thereof and which is slidable on the surface of said stationary blade in a direction along a row of said holes to cut and bend lead wires inserted through said side holes of said stationary blade; and

a central lever slidably connected at one end thereof to said main shaft so as to be slidable with respect to said main shaft, said central lever being pivotally mounted on a surface of said fixed block perpendicular to said side surfaces thereof on which said side levers are mounted, and said central lever having a central movable blade member provided at the other end thereof which is slidable on the



surface of said stationary blade in a direction across said row of said holes to cut and bend a lead wire inserted thorugh said central hole of said stationary blade.

4,586,545

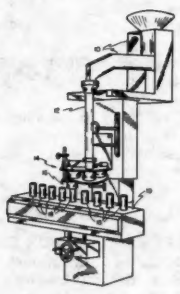
SOLID PRODUCT FILLING AND MEASURING APPARATUS

Jean C. Marchadour, 7734 Avondale Dr., Salt Lake City, Utah 84121

Filed Oct. 1, 1984, Ser. No. 656,341

Int. Cl.⁴ B65B *1/24, 1/04, 3/04*

U.S. Cl. 141—1 **10 Claims**



1. In a machine for filling solid food products into containers, said machine having a feed hopper, a feed tube, a dosing assembly and a container filling station, wherein the dosing assembly includes a moving plate with a plurality of pockets adapted to be successively filled from the feed tube as the plate moves intermittently so that the pockets successively move beneath the feed tube, the improvement in the dosing assembly comprising

a piston positioned beneath the feed tube to move upwardly into a respective pocket in said plate when the respective pocket is positioned beneath the feed tube, and to move downwardly from and clear the respective pocket such that the plate is free to move without interference during the intermittent movement of the plate;

a plurality of needle-like elements;

a plurality of apertures in the side of said feed tube each for receiving a different one of said needle-like elements; and

means for intermittently advancing the needle-like elements so that they extend through respective apertures in the

feed tube to form a gate across the feed tube which blocks movement of material therepast, and thereafter retracting the elements.

4,586,546

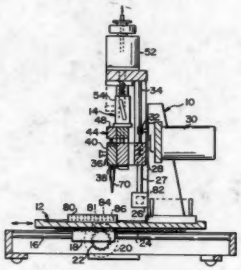
LIQUID HANDLING DEVICE AND METHOD

Louis M. Mezei, Fremont; Richard W. Reeves, San Rafael; Richard A. Leath, and Joseph T. Widunas, both of Berkeley, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Filed Oct. 23, 1984, Ser. No. 663,882

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—2 **13 Claims**



11. A method for reducing the difference between actual and specified amounts of liquid being transferred by an automated device from one receptacle to another comprising

representing the actual amount of liquid transferred by such automated device as a polynomial expression whose variable terms represent corresponding specified amounts of liquid withdrawn,

using data pertaining to actual transfer volumes to solve for the polynomial expression,

using the solved expression to determine a correction factor between actual and specified amounts of liquid to be withdrawn, and

applying the correction factor to the automated device to correct the amount of liquid transferred by such automated device to reduce the difference between actual and specified liquid amounts.

4,586,547

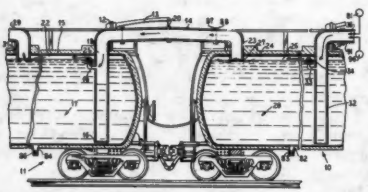
BALL VALVE PURGE DEVICE FOR TANK CARS

Stephen F. Fields, Wilmette, and C. K. Krishnakumar, Lombard, both of Ill., assignors to General American Transportation Corporation, Chicago, Ill.

Filed May 18, 1984, Ser. No. 611,721

Int. Cl.[4] B65B *1/04, 3/04*

U.S. Cl. 141—35 **8 Claims**



1. Apparatus for loading and purging a plurality of tank cars comprising, an eduction pipe mounted in the tank of each tank car and extending to adjacent the bottom of each tank, a vent pipe mounted in each tank car and its outlet terminating near the top of said tank, a plurality of connecting conduits extending between adjacent tank cars and with first ends connected to the vent pipe of one car and second ends connected to the eduction pipe of an adjacent tank car, means for supplying liquid cargo to one of said tank cars, and a plurality of one way valves with one of each connected respectively to one of said eduction pipes and with an outlet adjacent the top of said tank car, wherein said one way valves allow fluid to pass from said eduction pipe into the upper space of said tank car but prevent fluid from passing from said tank car into said eduction pipe, and wherein each of said one way valves comprise an L-shaped pipe which has one end connected to said eduction pipe and has a second end formed with a valve seat, and a valve moveably mounted to said valve seat.

4,586,548

ARRANGEMENT FOR FILLING OF LIQUIDS

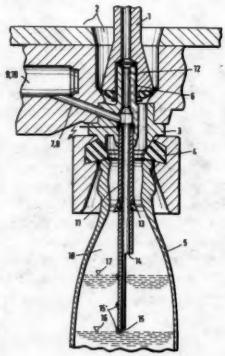
Aloys Hinxlage, Dortmund, Fed. Rep. of Germany, assignor to Holstein und Kappert GmbH, Dortmund, Fed. Rep. of Germany

Filed Dec. 12, 1983, Ser. No. 560,424

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1982, 3245731

Int. Cl.[4] B65B *31/00*

U.S. Cl. 141—57 **7 Claims**



1. A filling element for filling liquids under counterpressure in containers, such as bottles, cans, and the like, comprising a valve body having an axis and movable in an axial direction; a return gas pipe insertable into a container; an evacuating valve and an unloading valve connectable to a vacuum passage and arranged for evacuating a surrounding air from the container before filling thereof and unloading a negative pressure formed in the container after the filling; and pretensioning, unloading and evacuating conduits connectable with said return gas pipe so that evacuating, pretensioning and unloading of the container is performed via said same return gas pipe, said conduits including a common evacuating and unloading conduit connectable with said evacuating valve and said unloading valve.

4,586,549

VACUUM FILLING MACHINES

Neil D. White, Ferntree Gully, Australia, assignor to Kawite Packaging Pty. Ltd., Victoria, Australia

PCT No. PCT/AU83/00136, § 371 Date May 29, 1984, § 102(e) Date May 29, 1984, PCT Pub. No. WO84/01348, PCT Pub. Date Apr. 12, 1984

PCT Filed Sep. 29, 1983, Ser. No. 618,404

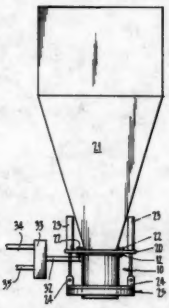
Claims priority, application Australia, Sep. 29, 1982, PF6110

Int. Cl.[4] B65B *1/16*

U.S. Cl. 141—67 **11 Claims**

1. A filling head (10) for a vacuum filling machine of the kind

used to package powdered or granular product into containers in a manner wherein removal of a container from sealing engagement with the filling head causes shearing of the product across an outlet port (16) such that the product forms a bridge whereby delivery of product is stopped, said machine including a hopper (21) for supplying said product to said filling head, characterized in that, said head includes an outlet duct (15) extending downwardly from said hopper to said outlet



port (16), said outlet port surrounding a valve member (17) located at said port in a manner causing a restriction to the flow of product through said port but being incapable of completely closing said port and said valve member being adjustable whereby the port area surrounding said valve member may be increased or decreased to facilitate variation of the compaction density of said product in said hopper during use of said machine.

4,586,550

REINFORCING TIMBER

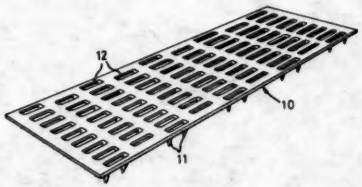
Sritawat Kitipornchai, Brookfield, Australia, assignor to University of Queensland, Queensland, Australia

Filed Sep. 28, 1984, Ser. No. 655,422

Claims priority, application Australia, Sep. 28, 1983, PG1606

Int. Cl.[4] B27F *7/00*

U.S. Cl. 144—353 **7 Claims**



1. A method of reinforcing a timber beam positioned transversely to an applied load acting downwardly on the beam intermediate the ends thereof and tending to deflect the beam intermediate its ends as a result of such applied load, said beam having top and bottom surfaces, the top surface being subjected to the loading, comprising the steps of:

(a) providing at least one metal reinforcing plate having a plurality of teeth extending in the same direction perpendicularly to the plane of the body of said plate, and

(b) mounting said plate on the top or bottom surface of said beam over a portion of the length of said beam by embedding said teeth in said beam, said plate when said beam is subjected to loading being placed under compression if applied to the top of said beam, or placed under tension if applied to the bottom of said beam, thereby increasing the stiffness of said beam and the ability to resist bending.

4,586,551

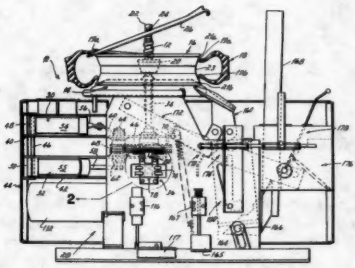
CENTERPOST DRIVE FOR A TIRE CHANGING MACHINE

Curran N. Collins, Goshen, Ohio, assignor to Big Four Equipment, Inc., Maineville, Ohio

Filed Apr. 9, 1985, Ser. No. 721,299

Int. Cl.[4] B60C *25/08*

U.S. Cl. 157—1.24 **14 Claims**



1. In a tire changing machine having a rotatable centerpost shaft adapted to mount a tire and wheel, a drive assembly for rotating the centerpost shaft for mounting and demounting of the tire from the wheel comprising:

a plurality of fluid motors;

means for drivingly connecting said fluid motors to said centerpost shaft;

a valve body formed with a plurality of sets of ports, said ports in each of said sets being spaced about the perimeter of said valve body, each of said sets of ports being axially spaced along said valve body from one another;

a valve spool rotatable within said valve body, said valve spool being formed with a plurality of axially spaced flow passage means, each of said flow passage means being disposed in fluid communication with one of said sets of ports in said valve body for interconnecting said ports in each of said sets;

means for directing operating fluid to said sets of ports in said valve body;

fluid line means for directing operating fluid from said sets of ports in said valve body to said fluid motors;

means drivingly connecting said valve spool to said centerpost shaft for rotating said valve spool within said valve body, said valve spool being operable to control the flow of operating fluid through said fluid line means to said fluid motors for sequentially driving said fluid motors to rotate said centerpost shaft.

4,586,552

ROLLING CLOSURE GUIDE MEANS

H. M. Robert Labelle, Cornwall, Canada, assignor to Martinray Industries Ltd., Cornwall, Canada

Filed Jan. 25, 1984, Ser. No. 573,672

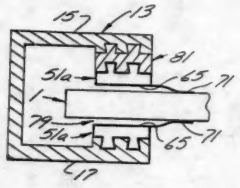
Claims priority, application Canada, Jun. 10, 1983, 430165

Int. Cl.[4] E06B *9/34*

U.S. Cl. 160—133 **2 Claims**

2. In a guide system for guiding one of two rolling closures of different thickness, the closures differing in thickness by an incremental thickness; the system having a minimum of at least four separate elements comprising: a guide member having a pair of opposing walls between which a side edge of a selected closure from the two closures is to be guided, two guide strips and one spacer strip for use with the guide member: and the guide member having a size to accomodate the thickest closure: each guide strip having a guiding surface and a mounting surface, the spacer strip having a first mounting surface and a second mounting surface; co-operating structural means on the mounting surfaces of the guide and spacer strips, and on the

inner faces of the walls of the guide member so that the spacer strip can be detachably mounted to one of the walls and so that the guide strips can each be detachably mounted to a wall or to the spacer strip, the spacer strip having a thickness equal to the incremental difference in thickness between the closures; the two guide strips mounted on the guide member with their



mounting surfaces so as to have their guide surfaces facing each other to make the guide member operative, at least one of the guide strips selectively mounted directly on the guide member, or indirectly on the guide member via the spacer strip so as to have the distance between the guide surfaces on the guide strips fit the thickness of the selected closure of the two closures of different thickness to be guided.

4,586,553

PISTONS

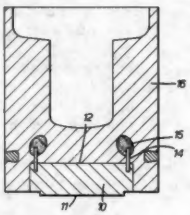
Gordon L. Allen, Rugby; Robert Munro, and Roger A. Day, both of Lymington, all of England, assignors to AE PLC, Warwickshire, England

Filed Jun. 24, 1983, Ser. No. 507,568

Claims priority, application United Kingdom, Jun. 25, 1982, 8218498

Int. Cl.⁴ B22C *9/10*

U.S. Cl. 164—30 **2 Claims**



1. A process for pressure-casting a piston with a crown insert and a cooling cavity in the piston crown, comprising:

forming an annular salt core,

preforming a piston insert of generally annular shape of cast metal, with a first surface, which is to form a surface of the finished piston, the annular soluble salt core being wholly within the piston insert,

placing the precast piston insert including the annular salt core in an open lower mould member with said first insert surface on a base of the lower mould member,

filling the open lower mould member with a molten metal,

closing the lower mould member with an upper mould member,

solidifying the molten metal under pressure to form a cast piston in which the precast piston insert is incorporated, to reinforce the crown of the piston,

removing the upper mould member,

extracting the cast crown reinforced piston,

drilling the casting and the insert, and then

flushing out the soluble salt core from the crown insert.

4,586,554

PROCESS FOR MANUFACTURING FIBER REINFORCED LIGHT METAL CASTINGS

Eggert Tank, Wernau, and Peter Straub, Fellbach, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 6, 1985, Ser. No. 698,795

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1984, 3404092

Int. Cl.⁴ B22D *19/14*

U.S. Cl. 164—97 **11 Claims**

1. A die casting process for the production of fibre reinforced metal castings containing fibrous material and metal comprising:

placing said fibrous material into an opened reusable auxiliary mould means, said mould means having at least two parts,

closing said auxiliary mould means,

heating said auxiliary mould means containing said fibrous material to a temperature at which said metal exists in a molten state,

placing said auxiliary mould means into a die casting mould means with positive fit, said die casting mould means having an inner contour corresponding to an outer contour of said auxiliary mould means, and

filling said auxiliary mould means with said metal in a molten state under pressure.

4,586,555

MOLD MAKING PLANT

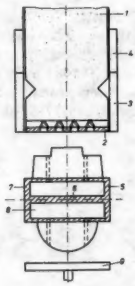
Eugen Bühler, Schleifweg 3, 8877 Burtenbach, Fed. Rep. of Germany

Filed Oct. 26, 1984, Ser. No. 665,203

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1983, 3339620

Int. Cl.⁴ B22C *15/24*

U.S. Cl. 164—180 **8 Claims**



8. A mold making plant for the production of flaskless molds from wet-casting foundry sand comprising a sand supply container, a blowing and squeezing grid at a lower end of said container, said grid being able to be moved vertically, a mold making flask means, a hollow pattern plate mount, valve and duct means connected with the said mount, said mold making flask means being made up of a cope flask and a drag flask, the cope flask when empty being placed over the drag flask fittingly around said sand container in the manner of a cylinder around a piston.

4,586,556

GUIDE RING FOR BOTTOM POUR INGOT MOULD SYSTEM

Paul D. Eckenrode, Newton Falls, and Richard P. Eisenbrei, Youngstown, both of Ohio, assignors to Microdot Inc., Darien, Conn.

Filed Jul. 11, 1984, Ser. No. 629,816

Int. Cl.⁴ B22D *33/00*

U.S. Cl. 164—342 **1 Claim**

1. In a bottom pour ingot mould system comprising a sprue

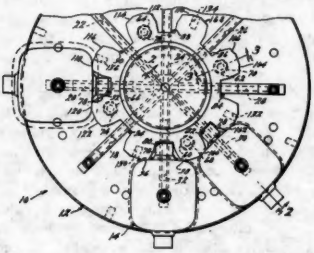
plate, a vertically extending center runner supported by said sprue plate, and a plurality of horizontal runners in said sprue plate each having an inlet for the acceptance of molten steel from said center runner and an outlet communicating with the bottom inlet of a steel ingot mould, an improved system for positioning said ingot moulds on said sprue plate comprising:

a one-piece annular guide ring telescoped over said center runner,

a plurality of upstanding pins on said sprue plate,

a plurality of sockets on the bottom of said guide ring for the acceptance of said pins for locating said guide ring,

a plurality of circumferentially spaced generally rectangular recesses in the radially outer periphery of said guide ring for the acceptance of complementary rectangular flanges on the ingot moulds, respectively, said recesses and flanges cooperating to preclude rotation of said moulds about a vertical axis relative to said sprue plate, wherein,



the width of each of said recesses, measured in the circumferential direction, increases with increasing radial distance from the center of the guide ring,

a pair of angularly related circumferentially spaced positioning pads on said guide ring on opposite sides of each of said recess for engagement of the body of said moulds, respectively, whereby each of said moulds is positioned radially and circumferentially relative to said center runner and to the outlets in the runners of said sprue plate,

the outlets in said horizontal runners comprising upstanding nozzles and said moulds being telescoped thereover, said guide ring having a vertical dimension greater than that of said nozzles to accommodate engagement of said mould with said ring upon horizontal movement of said mould above said nozzles to engage said flange within said recess and postion said pads against the mold body and subsequent downward movement of said moulds over said nozzles while engaged with said ring.

4,586,557

ONE-PIECE, OPEN-ENDED, WATER-COOLED CONTINUOUS CASTING MOULD AND METHOD OF MAKING THE SAME

Egon Evertz, Vorlander strasse 23, 5650 Solingen, Fed. Rep. of Germany, and Rolf Seybold, Solingen, Fed. Rep. of Germany, assignors to Egon Evertz, Solingen, Fed. Rep. of Germany

Filed Apr. 9, 1984, Ser. No. 598,006

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1983, 3313503

Int. Cl.⁴ B22D *11/00*

U.S. Cl. 164—418 **20 Claims**

1. A method of making a one-piece, open-ended, water-cooled continuous casting mold comprising:

providing a smooth metal core having a smooth surface defining the exact geometrical cross-sectional shape of the mold and a length greater than the length of the mold;

depositing on said core a parting layer 1μ thick of chromium;

treating said chromium layer in hot water to produce micro-fissures in the surface of said layer;

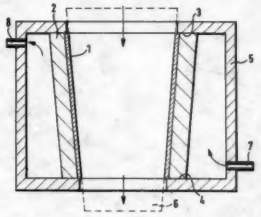
depositing a conducting layer of a light copper coating on said chromium layer which fills in said micro-fissures;

galvanically depositing a coating of nickel on said copper coating approximately 2 mm thick to form an inner wear-resistant metal layer;

galvanically depositing on said nickel coating an exterior copper layer approximately twice the thickness as said inner nickel layer;

removing said core from the mold; and

accurately machining the two end faces of the mold for mounting in a water-cooled box.



20. A one-piece, open-ended mold for use as a water-cooled continuous casting mold comprising:

a galvanically deposited inner layer of wear-resistant material and a galvanically deposited external layer on the outer surface of said inner layer, wherein said inner layer has a thickness of up to 35% of the total mold wall thickness, made by the process recited in claim 1.

4,586,558

STRUCTURE OF FEED NOZZLE UNIT FOR HORIZONTAL CONTINUOUS CASTING PROCESS

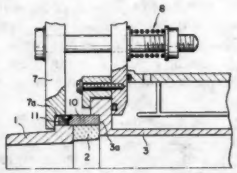
Takasuke Mori, Hyogo; Jun Miyazaki, Kobe; Manabu Miyamoto, Kobe, and Kiichi Narita, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jan. 18, 1984, Ser. No. 571,693

Claims priority, application Japan, Jan. 18, 1983, 58-5919[U]

Int. Cl.⁴ B22D *11/10*

U.S. Cl. 164—440 **6 Claims**



1. A feed nozzle unit for a horizontal continuous casting device utilizing a mold, comprising:

a feed nozzle disposed in coaxial relation with said mold;

an assembly member having a stepped portion against which a portion of said feed nozzle abuts;

a cylindrical fixing member fixedly connected to said mold and positioned within said stepped portion of said assembly member, said feed nozzle being fixed to and connected in coaxial relation with said fixing member; and

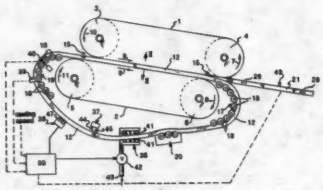
a refractory member fitted radially within and in coaxial relation with said fixing member so as to interconnect said feed nozzle and said mold.

4,586,559

PROCESS AND APPARATUS FOR CASTING A STRIP WITH LATERALLY EXTENDING LUGS

Marcel K. Govaerts, Olen; Hendrik A. L. Gielen, Kasterlee, and John M. A. Dompas, Olen, all of Belgium, assignors to Hazelett Strip-Casting Corporation, Colchester, Vt.

Continuation of Ser. No. 617,801, Jun. 6, 1984, abandoned, which is a continuation of Ser. No. 307,625, Oct. 1, 1981, abandoned. This application Sep. 6, 1985, Ser. No. 774,161
Claims priority, application Luxembourg, Jul. 9, 1981, 83485
Int. Cl.[4] B22D *11/06, 11/16, 11/22*
U.S. Cl. 164—455 12 Claims



1. In a process for casting a strip with laterally extending lugs by:

introducing molten metal into the inlet of a molding zone having a bottom and sidewalls, the bottom of the molding zone being formed by the upper surface of a moving endless belt and the sidewalls being formed by a first and second moving endless sidedam, said sidedams moving with the belt from the inlet to the outlet of the molding zone at a predetermined casting speed in linear travel distance per unit of time and returning outside of the molding zone from the outlet to the inlet, each sidedam comprising an endless strap and a multiplicity of blocks strung thereon, some of said blocks forming lug molding pockets, and the height of each pocket being lower than the height of the molding zone;

extracting a cast strip with laterally extending lugs from the outlet of the molding zone;

detecting the passage of lug molding pockets or blocks forming these pockets on each sidedam; and

correcting the difference between the temperatures of the first and the second sidedams so as to change the advancing speed of at least one of these dams, a warmer sidedam moving slower than a colder sidedam, if an unwanted lag is found between the molding pockets of the first sidedam and those of the second sidedam;

the improved method of synchronizing the actual positions of the respective cast lugs on opposite edges of the cast strip comprising the steps of:

detecting a first difference in the time of the passage of lug molding pockets or blocks forming these pockets of the first and second sidedams near the inlet of said molding zone;

detecting a second difference in the time of the passage of the laterally extending cast lugs on the opposite edges of the cast strip near the outlet of said molding zone;

multiplying said first time difference by the predetermined casting speed to obtain the value L1 of the linear lag between the respective advancing movements of the pockets of the first and second sidedams;

multiplying said second time difference by the predetermined casting speed to obtain the value L2 of the linear lag between the respective advancing movements of the cast lugs on opposite edges of the cast strip;

comparing the pocket linear lag value L1 with a first predetermined linear lag value L1C and using the difference therebetween as the basis for correcting said difference in temperatures for changing the speed of advancing of at least one of the two sidedams for attempting to synchronize their advancing movements through the molding zone;

comparing the lug linear lag value L2 with a second predetermined linear lag value L2C; and

modifying the first predetermined linear lag value L1C as a function of the difference between the lug linear lag value L2 and the second predetermined linear lag value L2C for improving the synchronizing of the respective advancing movements of the cast lugs on opposite edges of the cast strip.

8. An apparatus for casting a strip with laterally extending lugs by introducing molten metal into the inlet of a molding zone having a bottom and sidewalls, the bottom of the molding zone being formed by the upper surface of a moving endless belt and the sidewalls being formed by a first and second moving endless sidedam, said sidedams moving with the belt from the inlet to the outlet of the molding zone at a predetermined speed in linear travel distance per unit of time and returning outside of the molding zone from the outlet to the inlet, each sidedam comprising an endless strap and a multiplicity of blocks strung thereon, some of said blocks forming lug molding pockets, and the height of each pocket being lower than the height of the molding zone, and wherein the cast strip with laterally extending lugs on each edge is extracted from the outlet of the molding zone, including means for detecting the passage of lug molding pockets or blocks forming these pockets on each sidedam, and cooling means for correcting the difference between the temperature of the first and the second sidedams so as to change the advancing speed of at least one of these dams, a warmer sidedam moving slower than a colder sidedam, if an unwanted lag is found between the molding pockets of the first sidedam and those of the second sidedam,

apparatus for synchronizing the actual positions of the respective cast lugs on opposite edges of the cast strip comprising:

first detecting means for detecting a first difference in the time of the passage of lug molding pockets or blocks forming these pockets of the first and second sidedams near the inlet of said molding zone;

second detecting means for detecting a second difference in the time of the passage of the laterally extending cast lugs on the opposite edges of the cast strip near the outlet of said molding zone;

heating means for heating each of said sidedams;

control means for controlling said heating and cooling means,

said first and second detecting means being connected to said control means,

said control means including multiplying means for multiplying said first time difference by the predetermined casting speed to obtain the value L1 of the linear lag between the respective advancing movements of the pockets of the first and second sidedams and for multiplying said second time difference by the predetermined casting speed to obtain the value L2 of the linear lag between the respective advancing movements of the cast lugs on opposite edges of the cast strip;

said control means including comparator means for comparing the pocket linear lag value L1 with a first predetermined linear lag value L1C,

said control means using the difference therebetween as the basis for controlling said heating means and said cooling means for correcting said difference in temperatures for changing the speed of advancing of at least one of the two sidedams for attempting to synchronize their advancing movements through the molding zone;

said control means including second comparator means for comparing the lug linear lag value L2 with a second predetermined linear lag value L2C; and

said control means modifying the first predetermined linear lag value L1C as a function of the difference between the lug linear lag value L2 and the second predetermined linear lag value L2C for improving the synchronizing of

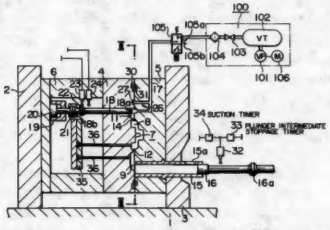
the respective advancing movements of the cast lugs on opposite sides of the cast strip.

4,586,560

DIE-CASTING METHOD AND APPARATUS

Seizi Ikeya, Kariya, and Tsuyoshi Tabuchi, Hekinan, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 22, 1985, Ser. No. 736,762
Claims priority, application Japan, May 24, 1984, 59-106172
Int. Cl.[4] B22D *17/14, 17/32*
U.S. Cl. 164—457 **8 Claims**



1. A method of die-casting an article of a metal by injecting molten metal from an injection sleeve by an injection plunger into a product cavity defined by movable and stationary dies which cooperate to define a suction channel arranged adjacent to said product cavity and communicated with said product cavity through a suction vent passage of a cross-section small enough to block the passage of the molten metal therethrough, said method comprising the steps of:

charging a quantity of the molten metal into a space defined by said injection sleeve and plunger;

moving said injection plunger forwardly at a lower speed in said injection sleeve while said product cavity is communicated with the atmosphere until a position is reached in which the volume defined by said injection sleeve and plunger is substantially filled with the molten metal;

temporarily stopping the forward movement of said injection plunger substantially at said position;

interrupting the communication between said product cavity and the atmosphere and simultaneously communicating said product cavity with a vacuum source through a vacuum gate and a vacuum runner so that said product cavity is evacuated through said vacuum gate and vacuum runner by said vacuum source;

after the lapse of a predetermined time period, interrupting the communication between said product cavity and said vacuum source through said vacuum gate and runner and communicating said product cavity through said suction vent passage and said suction channel with said vacuum souce to keep said product cavity evacuated by said vacuum source; and

again moving said injection plunger forwardly at a higher speed so that the molten metal in said injection sleeve is injected therefrom into said product cavity.

4. An apparatus for die-casting an article of a metal, comprising:

a stationary die;

a movable die movable into face-to-face engagement with said stationary die to cooperate therewith to define a product cavity, a suction channel arranged adjacent to said product cavity and suction vent passage communicating said product cavity with said suction channel;

an injection sleeve communicated with said product cavity and adapted to receive a quantity of molten metal;

an injection plunger slidable in said injection sleeve and adapted to be driven forwardly to force the molten metal in said injection sleeve toward said product cavity;

means associated with said injection plunger for detecting a position thereof in which a space defined by said injection sleeve and plunger is substantially filled with the molten metal;

a vacuum source means;

said stationary and movable dies further cooperating to define a vacuum runner and a vacuum gate communicated therewith;

said vacuum source means being adapted to be communicated with said product cavity through said suction channel and suction vent passage and also adapted to be communicated with said product cavity through said vacuum runner and said vacuum gate;

first valve means for controlling the communication between said vacuum source means and said product cavity through said vacuum gate and said vacuum runner;

second valve means having two operative positions in one of which said product cavity is communicated with said vacuum source means through said vacuum gate and vacuum runner as well as through said suction vent passage and said suction channel and in the other of which said product cavity is communicated with the atmosphere through said vacuum gate and vacuum runner as well as through said suction vent passage and said suction channel;

the arrangement being such that said second valve means is kept in said other position until said detecting means detects said position of said injection plunger, such that the position of said second valve means is changed over to said one position when said detecting means detects said position of said injection plunger, such that, after the lapse of a predetermined time period from the change-over of the position of said second valve means, said first valve means interrupts the communication between said vacuum source means and said product cavity through said vacuum gate and vacuum runner and said injection plunger is further driven forwardly to inject the molten metal from said injection sleeve into said product cavity;

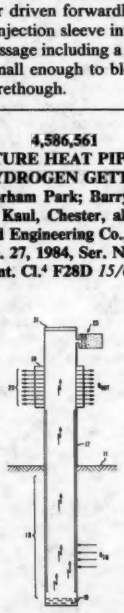
said suction vent passage including a suction vent section of a cross-section small enough to block the passage of the molten metal therethough.

4,586,561

LOW TEMPERATURE HEAT PIPE EMPLOYING A HYDROGEN GETTER

Robert J. Franco, Florham Park; Barry J. Berkowitz, Scotch Plains, and Bal K. Kaul, Chester, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Feb. 27, 1984, Ser. No. 583,946
Int. Cl.[4] F28D *15/00*
U.S. Cl. 165—1 **11 Claims**



10. A process for removing contaminant H_2 gas from a heat pipe employing ammonia as the heat transport medium comprising contacting said hydrogen gas in the presence of ammonia and air with an intermetallic alloy hydrogen getter material

selected from the group consisting of $ZrMn_2$, $ZrMn_x$ where x=1.8–3.8, ZrNi, ZrAl, ZrYFe, ZrTiNi and mixtures thereof.

4,586,562

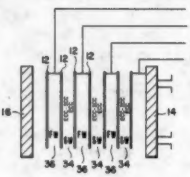
PLATE AND FRAME HEAT EXCHANGER ASSEMBLY WITH ANODIC PROTECTION

Richard C. Carlson, Euclid; Donald L. DeRespiris, Mentor; Anthony R. Sacco, Chardon, all of Ohio; Donald J. Groszek, and Bonnie M. Ivancic, both of Florence, Ala., assignors to Eltech Systems Corporation, Boca Raton, Fla.

Filed Aug. 10, 1983, Ser. No. 521,944

Int. Cl.[4] F28F *19/02, 3/08;* C23F *13/00*

U.S. Cl. 165—134.1 **10 Claims**



1. A plate heat exchanger assembly having an anodic protection system comprising:

a structural frame including opposed pressure plates at opposite ends having an inlet and outlet for a first process fluid that is prone to cause fouling of heat exchange surfaces and a separate inlet and outlet for a second process fluid less prone to such fouling and means for applying compressive force between said pressure plates;

a plurality of corrugated heat exchange plates mounted on said frame between said pressure plates in close, face-to-face relationship defining a fluid passageway between each pair of adjacent corrugated plates, each such passageway being in selective communicating with the inlet and outlet for one of said two process fluids with an alternating sequence between the two;

an insulating contact coating selectively disposed only at points of potential electrically conductive contact between those adjacent plates which define a fluid passageway for said first process fluid; and

means for selectively applying a voltage across those passageways carrying said first process fluid, whereby biofouling and scaling are inhibited therein.

4,586,563

TUBE-AND-PLATE HEAT EXCHANGER

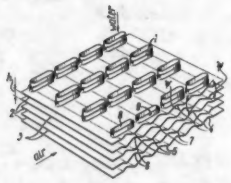
Evgeny V. Dubrovsky, ulitsa Chaikovskogo, 18, kv. 203, Moscow; Leonid A. Averkiev, ulitsa Gagarina, 40-a, kv. 137, Orenburg, and Natalya I. Martynova, ulitsa Komsomolskaya, 15, kv. 38, Ljubertsy Moskovskoi oblasti, all of U.S.S.R.

PCT No. PCT/SU79/00041, § 371 Date Feb. 3, 1981, § 102(e) Date Feb. 3, 1981, PCT Pub. No. WO80/02872, PCT Pub. Date Dec. 24, 1980

PCT Filed Jun. 20, 1979, Ser. No. 233,590

Int. Cl.[4] F28D *1/04*

U.S. Cl. 165—151 **1 Claim**



1. A tube-and-plate heat exchanger for said exchanging heat between first and second heat carriers, said heat exchanger comprising:

a plurality of tubes through which the first heat carrier flows, the tubes oriented in a parallel array;

an inlet and an outlet for said second heat carrier; and

a plurality of spaced plates mounted on said tubes, each of said tubes extending through each of said plurality of plates, each pair of adjacent plates defining a passageway between said inlet and said outlet to convey said second heat carrier across said tubes, the cross section of each plate being in the form of alternating depressions and projections in the direction of flow defining a continuous symmetrically waved line, adjacent plates being positioned so that the depressions of one plate are opposite the projections of an adjacent plate, the space between each set of plates defining a passageway having continuous, symmetrical, alternately converging and diverging sections, the diverging sections having an angle of divergence (ψ) in the direction of flow of said second heat carrier and with respect to the axis of the passageway selected to be greater than the critical angle at which the loss in hydrodynamic stability of the laminar structure of the second heat carrier flow occurs, each of the plates including rectilinear sections between adjacent depressions and projections, the projections and the depressions of the spaced plates being in continuous relationship and the rectilinear sections having the same angle (ϕ) of inclination to the axis of symmetry of the wave line outlining the cross section of the spaced plate, which angle equals halve the angle (ψ) of divergence, wherein the projections and the depressions of the spaced plates have an inner radius (R) of bending between one and twenty times the thickness (δ) of the material of the spaced plate.

4,586,564

GUIDE WALL OF A HEAT EXCHANGER FOR COVERING THE U-SHAPED PORTIONS OF A TUBE ASSEMBLY

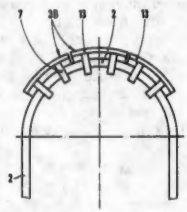
Klaus Hagemeister, Munich, Fed. Rep. of Germany, assignor to Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 3, 1984, Ser. No. 677,190

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1984, 3401536

Int. Cl.[4] F28D *7/06*

U.S. Cl. 165—159 **25 Claims**



1. A heat exchanger comprising an assembly of spaced heat exchanger tubes of U-shaped having inlet ends for receiving an operating fluid, outlet ends for discharge of said fluid and U-shaped portions for flow reversal of said fluid, a housing receiving said tube assembly and including an inlet for a second fluid for flow across said assembly to undergo heat exchange with the fluid flowing in the tubes and an outlet for discharge of the second fluid, said housing having an opening through which said U-shaped portions of said tubes extend for free displacement relative to said housing, a guide wall surrounding said tubes at said U-shaped portions and connected to said housing to cover said opening therein, said guide wall being

corrugated lengthwise of said tube assembly and including peaks and valleys, said tubes of said assembly being received within the peaks of said corrugated guide wall, means supporting said corrugated guide wall on said tubes of said assembly in floating relation and means supporting said guide wall, at opposite ends thereof, on said housing for relative movement, the combination of the support of the guide wall in floating relation on the tube assembly and for movement on the housing permitting free movement of said tube assembly relative to said housing and relative movement of said tubes with respect to one another and to said corrugated guide wall.

4,586,565

PLATE EVAPORATOR

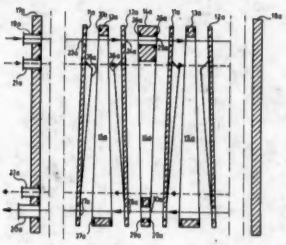
Bengt Hallström, Lund; Olle Olsson, Åstorp; Ulf Bolmstedt, Staffanstorp, and Björn-Olow Johansson, Lomma, all of Sweden, assignors to Alfa-Laval AB, Tumba, Sweden

Filed Dec. 8, 1981, Ser. No. 328,692

Claims priority, application Sweden, Dec. 8, 1980, 8008594

Int. Cl.⁴ F28F *13/08*; B01D *1/22*

U.S. Cl. 165—167 **17 Claims**



11. The evaporator of claim **1**, in which the two plates of each said pair defining an evaporation passage diverge from each other in said flow direction, thereby further increasing the cross-sectional area of the evaporation passage in said flow direction.

4,586,566

ARRANGEMENT FOR JOINING THE TUBES OF A HEAT EXCHANGER CORE WITH A CONNECTING BOX PARTICULARLY FOR EVAPORATORS

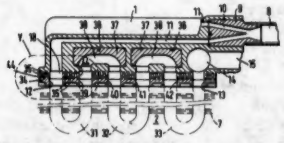
Josef Kern; Helmut Bardong, both of Stuttgart; Bohumil Humpolik, Ludwigsburg, and Karl-Heinz Staffa, Stuttgart, all of Fed. Rep. of Germany, assignors to Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. KG, Stuttgart-Feuerbach, Fed. Rep. of Germany

Filed Aug. 17, 1982, Ser. No. 408,907

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1981, 3133665

Int. Cl.⁴ F28F *9/04, 9/16*; F28D *7/06*

U.S. Cl. 165—173 **1 Claim**



1. An arrangement sealingly joining tubes of a heat exchanger core to a connecting box, wherein said connecting box comprises a bottom with cylindrical openings through which the ends of the tubes extend, and the tubes are spread in said openings and joined to said bottom in said openings in a press fit, wherein at least one space is provided inside the connecting box surrounding each tube, each said space comprising a cavity bounded by the connecting box bottom and the tube and being filled with adhesive material, and wherein said bottom is joined to said connecting box in a joint area and has a plurality of projections annularly surrounding each tube end, said projections engaging recesses in the connecting box to form a plurality of tongue and groove joints in the joint area between the connecting box and the bottom.

4,586,567

SUBTERRANEAN WELL TOOL WITH PRESSURE-EQUALIZING RELEASE

Robert C. Jameson, Houston, Tex., assignor to Baker Oil Tools, Inc., Orange, Calif.

Filed Jul. 16, 1984, Ser. No. 631,464

Int. Cl.⁴ E21B *33/126, 33/129, 34/08*

U.S. Cl. 166—121 **10 Claims**

1. A well tool adaptable for movement longitudinally in a subterranean well conduit, comprising: a tubular body; first and second normally retracted slip means disposed around said body; first and second expander means responsive to movement of said body, said expander means being relatively movable into engagement with said first and second slip means, respectively, to selectively expand only one of said first and second slip means against the well conduit, one of said first and second slip means when in expanded position resisting downward movement of said well tool within said conduit and the other of said first and second slip means when in expanded position resisting upward movement of said well tool within said conduit; elastomeric packing means on said body adjacent each said expander having a unidirectional sealing engagement with the conduit, whereby a downward fluid pressure differential on said elastomeric packing means shifts one of said expander means downwardly to expand said one slip means and an upward fluid pressure differential shifts the other said expander means. upwardly to expand said other slip means; a mandrel insertable in the bore of said tubular body and operatively engageable with said tubular body to retract the tool from the well, a bypass fluid passage defined between the exterior of said mandrel and the bore of said tubular body, said bypass fluid passage extending from a region above the upper one of said elastomeric packer means to a region below the lower one of said elastomeric packer means; an upper radial port in said tubular body communicating with the upper portion of said bypass passage; a lower radial port in said tubular body communicating with the lower portion of said bypass passage; a first valve mounted in the upper end of said bypass passage; first resilient means urging said first valve to a closed position between said upper radial port and said bypass passage; a

second valve mounted on said tubular body adjacent said lower port; a second resilient means urging said second valve to a closed position relative to said second port; axially spaced abutment means on said mandrel respectively engagable with said first and second valves by limited movement of said mandrel relative to said tubular body, thereby opening a fluid bypass around both said elastomeric packing means; and means on said tubular body operatively engaged by further movement of said mandrel to remove said tool from the well conduit.

4,586,568

POLYMERFLOOD PROCESS

Ahmad Moradi-Araghi, and James E. Shaw, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 29, 1985, Ser. No. 770,456
Int. Cl.[4] E21B *43/22*
U.S. Cl. 166—273 **16 Claims**

1. In a polymerflood process for the recovery of oil from subterranean oil reservoirs pentrated by spaced injection and production wells comprising the sequential injection of thickened aqueous solution and aqueous drive wherein the polymeric viscosifier bears pendant hydrolyzable groups, the improvement is the inclusion of a solution viscosity stabilizing amount of at least one low molecular weight polymer having a molecular weight of about 150–2000 of at least one of alpha,-beta-unsaturated mono- and dicarboxylic acids having a total of up to about 6 carbon atoms per molecule and alkali metal salts thereof in said thickened solution to stabilize the solution viscosity thereof.

4,586,569

RETRIEVABLE FLUID CONTROL VALVE

Walter E. Hyde, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Sep. 28, 1984, Ser. No. 656,065
Int. Cl.[4] E21B *34/08*
U.S. Cl. 166—317 **5 Claims**

1. A retrievable fluid control valve, comprising:

a first cylindrical spring housing member having a first cavity with only one opening thereto defined therein;

first spring means, disposed in said first cavity, for providing a first biasing force;

a first spring guide member disposed coaxially with said first spring means between said first spring means and said one opening of said first cavity;

a second cylindrical spring housing member having a second cavity with two openings thereto defined therein, said second spring housing member coaxially connected to said first spring housing member with said first cavity communicating with said second cavity through the only opening to said first cavity and one of said two openings to said second cavity;

second spring means, disposed in said second cavity, for providing a second biasing force;

a second spring guide member disposed coaxially with said second spring means between said second spring means and the other one of said two openings to said second cavity;

a first coupling member extending between said first and second spring guide members and having said second spring means mounted thereon;

a third cylindrical spring housing member having a third cavity with two openings thereto defined therein, said third spring housing member coaxially connected to said second spring housing member with said second cavity communicating with said third cavity through the other one of said two openings to said second cavity and one of the two openings to said third cavity;

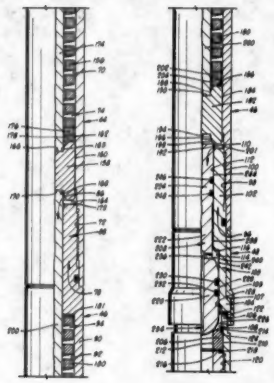
third spring means, disposed in said third cavity, for providing a third biasing force;

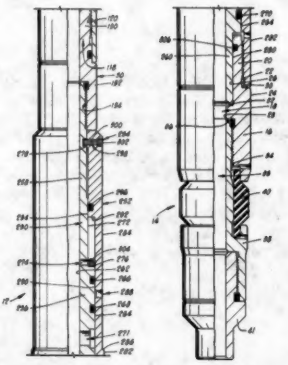
a third spring guide member disposed coaxially with said third spring means between said third spring means and the other one of said two openings to said third cavity;

a second coupling member extending between said second and third spring guide members and having said third spring means mounted thereon;

a valve housing member having a fourth cavity with three openings thereto defined therein, said valve housing member coaxially connected to said third spring housing member with said third cavity communicating with said fourth cavity through the other one of said two openings to said third cavity and a first one of said three openings to said fourth cavity;

a valve seat retained in said fourth cavity between a second one and a third one of said three openings to said fourth cavity;





a valve member slidably disposed in said fourth cavity in engagement with said third spring guide member so that said valve member is urged toward a closed position against said valve seat by said first, second and third biasing forces wherein said valve member obstructs fluid flow between said second one and said third one of said three openings to said fourth cavity and so that said valve member is urged toward an open position away from said valve seat by an external force acting against said first, second and third biasing forces wherein said valve member is removed from obstructing fluid flow between said second one and third one of said three openings to said fourth cavity;

a cylindrical bypass mandrel having a fifth cavity with three openings thereto defined therein, said bypass mandrel coaxially connected to said valve housing member with said fourth cavity communicating with said fifth cavity through the third one of said three openings to said fourth cavity and a first one of said three openings to said fifth cavity;

an outer bypass port member having a sixth cavity with three openings thereto defined therein, said outer bypass port member having said bypass mandrel concentrically disposed therethrough with the first one and a second one of the openings to said fifth cavity coaxially aligned with a first one and a second one of said three openings to said sixth cavity and with a third one of the three openings to said fifth cavity radially spaced from a third one of the three openings to said sixth cavity; and

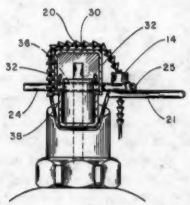
shear pin means for connecting said outer bypass port member to said bypass mandrel so that the third one of said three openings to said fifth cavity is longitudinally spaced from the third one of said three openings to said sixth cavity, said shear pin means responsive to a longitudinal force applied to said bypass mandrel for breaking said shear pin means so that said bypass mandrel is movable relative to said outer bypass port member to an open bypass position wherein the third one of said three openings to said fifth cavity is aligned with the third one of said three openings to said sixth cavity.

4,586,570

COMBINATION SEAL AND LOCKING PIN

Allan W. Swift, Denville, N.J., assignor to E. J. Brooks Company, Newark, N.J.

Filed Sep. 29, 1982, Ser. No. 426,291
Int. Cl.⁴ A62C *23/10*
U.S. Cl. 169—75 **11 Claims**



6. A seal for use in combination with a locking pin for locking and sealing a fire extinguisher handle, said seal having a shackle, a body including a socket disposed at one end of the shackle, and means on the body for detachably engaging an end of a locking pin and releasably retaining it in assembly with the body.

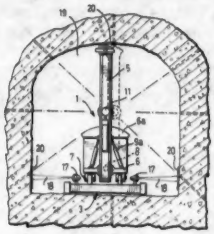
4,586,571

METHOD OF AND ARRANGEMENT FOR POSITIONING OF A DRILLING APPARATUS

Pauli Rajakallio, and Pentti Hyvönen, both of Tampere, Finland, assignors to Oy Tampella AB, Tampere, Finland

Filed Aug. 21, 1984, Ser. No. 643,004
Claims priority, application Finland, Sep. 2, 1983, 833145
Int. Cl.⁴ E21C *9/00*
U.S. Cl. 173—43 **7 Claims**

4. An arrangement for positioning of a drilling apparatus with respect to a drilling plane formed by holes to be drilled in a rock in a tunnel, which drilling apparatus (1,2) comprises a base (3) provided with a coupling means (14) for coupling the base to a transport vehicle (9) and a drill rig (4,5,13) supported by the base, characterized in that the apparatus is provided with at least one stationary mounted light source (17) for sending narrow light beams (18) in opposite directions, and that the coupling means (14) forms a pivot joint enabling the



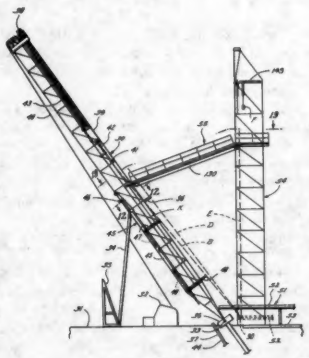
base to turn with respect to the transport vehicle (2) around a vertical axis (D).

4,586,572

WELL DRILLING APPARATUS

Thomas A. Myers, 3757 Perry La., Corpus Christi, Tex. 78410, and Robert P. Barnes, Corpus Christi, Tex., assignors to Thomas A. Myers, Corpus Christi, Tex.

Filed May 10, 1984, Ser. No. 608,962
Int. Cl.⁴ E21B *19/00*
U.S. Cl. 175—85 **17 Claims**



13. Well drilling apparatus, including

a base,

a mast pivotally mounted on the base for swinging about a horizontal axis,

means on the mast for raising and lowering a drill string along a drilling axis within the mast,

a mouse hole depending from the base rearwardly of and generally parallel to the drilling axis, and

an elongate pipe guide mounted on the mast to receive a pipe and shiftable laterally between a first position laterally to one side of the drilling axis and mouse hole and a second position generally aligned with the mouse hole.

4,586,573

ROTARY EXPANSION TOOL FOR REAMING FRUSTOCONICAL UNDERCUTS IN THE WALLS OF CYLINDRICAL HOLES

Richard H. Jones, 4439 Choctaw St., Baton Rouge, La. 70508

Continuation-in-part of Ser. No. 384,252, Jun. 2, 1982, Pat. No. 4,502,554. This application May 18, 1984, Ser. No. 611,344

The portion of the term of this patent subsequent to Mar. 5, 2002, has been disclaimed.

Int. Cl.[4] E21B *7/28*

U.S. Cl. 175—285 **19 Claims**

1. A rotary expansion tool for reaming frustoconical undercuts in the wall of a cylindrical hole and flushing cuttings out of the hole as the reaming process is occurring, said tool comprising:

an elongated sheath having an open end and an end for insertion into said hole, and first and second longitudinal opposing slots through the wall of said sheath intermediate said ends;

a ram disposed in sliding engagement within said sheath, a first end of said ram projecting out of said open end of said sheath and being provided with an enlarged head, a second end of said ram forming a clevis for placement in the interior of said sheath adjacent said opposing slots of said sheath, and a longitudinal passageway extending the length of said ram by which fluid introduced through said head can be conveyed to the second end of said ram;

biasing means between the open end of said sheath and the enlarged head of said ram for biasing said head away from said open end of said sheath;

means for imparting rotational movement of said ram to said sheath;

a load bearing collar disposed around said sheath intermediate said ends of said sheath for governing the depth of insertion of said tool into said hole, and a bearing assembly circumferentially disposed around said sheath between said sheath and collar for permitting said collar to remain stationary while said sheath rotates;

first and second opposing, elongated, substantially identical cutter holding elements, each cutter holding element having a front face and a back face, said cutter holding elements being pivotally supported in back to back relationship by a clevis pin mounted in said clevis, and a pivot pin transfixing said first and second cutter holding elements and said sheath;

means for pivoting said cutter holding elements around said pivot pin to expand said elements through said slots, said first cutter holding element expanding through said first slot and said second cutter holding element expanding through said second slot;

a cutter on each of said cutter holding elements, said cutter having a substantially flat cutting face which is disposed in reaming engagement with the walls of said hole to ream a frustoconical undercut when said cutter holding elements are expanded, said cutter being mounted on said cutter holding element so that the plane of said cutting face is substantially tangential to the wall of said hole being reamed as the reaming process occurs.

4,586,574

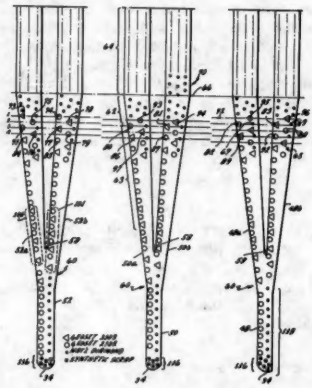
CUTTER CONFIGURATION FOR A GAGE-TO-SHOULDER TRANSITION AND FACE PATTERN

Richard H. Grappendorf, Riverton, Utah, assignor to Norton Christensen, Inc., Salt Lake City, Utah

Filed May 20, 1983, Ser. No. 496,611

Int. Cl.[4] E21B *10/46*

U.S. Cl. 175—329 **22 Claims**



1. In a rotating bit with a gage defining a bore diameter including, a center and shoulder transitioning between said center and gage, an improvement comprising:

a plurality of polycrystalline diamond (PCD) cutting elements disposed on said shoulder, said elements disposed on said shoulder perpendicularly extending therefrom by a first predetermined distance; and

a plurality of diamond elements disposed on said gage and perpendicularly extending from said gage of said rotary bit by a second predetermined distance, the diameter of a hole bored by said rotary bit being defined by said diamond elements disposed in said gage, said polycrystalline diamond cutting (PCD) elements being disposed on said shoulder only up to a key level definded with respect to said gage, said polycrystalline diamond (PCD) element cutting at said key level defining a drilled bore substantially equal in diameter to said diameter defined by said diamond elements disposed in said gage.

4,586,575

MEASURING APPARATUS WITH AUTOMATIC OPERATING MODE-SETTING

Herbert Müerdter, Albstadt; Bernhard Hermann, Schömberg, and Johann Pfister, Balingen, all of Fed. Rep. of Germany, assignors to August Sauter GmbH, Albstadt, Fed. Rep. of Germany

Filed Feb. 28, 1985, Ser. No. 706,659

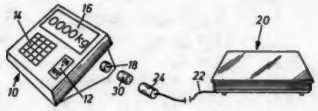
Claims priority, application Fed. Rep. of Germany, Feb. 29, 1984, 3407463

Int. Cl.[4] G01G *23/02, 23/14*

U.S. Cl. 177—124 **8 Claims**

1. Measuring apparatus such as a scale comprising an infor-

mation generating module, such as a weighing platform moduel, an evaluation module including a microprocessor, and a connecting conductor for operatively interconnecting the



modules, the measuring apparatus having at least two (2) different operating modes, and the connecting conductor including connector means for setting the apparatus in a predetermined one of said modes.

4,586,576

MEASURING SYSTEM

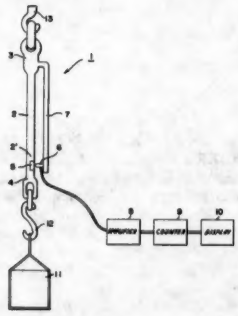
Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan

Filed Sep. 28, 1983, Ser. No. 536,891

Claims priority, application Japan, Sep. 28, 1982, 57-167695; Sep. 28, 1982, 57-167696

Int. Cl.⁴ G01G *3/14*; G01L *1/12*; G01B *7/14*

U.S. Cl. 177—210 R **15 Claims**



1. A measuring system comprising:

a magnetic pickup means for responding to magnetic fields;

a magnetic scale formed by a succession of discrete, uniformly spaced scaling units each of which individually consists of a pair of opposed magnetic poles (N,S), the successive pairs of opposed magnetic poles alternating in their magnetic polarities in a direction which is the same as or substantially parallel to a direction in which a deformable member is deformed, said magnetic scale being arranged to be displaced relative to the magnetic pickup means by an amount related to a deformation of the deformable member whereby the magnetic pickup means successively senses the passage of the magnetic scaling units; and

circuit means for counting the number of said magnetic scaling units sensed and producing an electrical output signal representing said deformation, or a physical quantity which is a function thereof.

4,586,577

LOAD CONVERTER

Yotaro Hatamura, 2-12-11 Kohinata, Bunkyo-ku, Tokyo, Japan

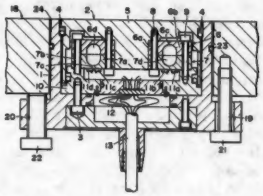
Filed Mar. 6, 1984, Ser. No. 586,759

Claims priority, application Japan, May 31, 1983, 58-96415

Int. Cl.⁴ G01G *3/14*; G01L *1/22*

U.S. Cl. 177—211 **9 Claims**

1. A load converter having a force-sensitive and deformable section, said force-sensitive and deformable section comprising fixed portions, movable portions, a pair of annular flexible thin portions having joint regions connecting said flexible thin portions to said fixed portions and said movable portions, said flexible thin portions being annular and parallel to and spaced from each other in directions perpendicular to planes parallel thereto and extending to connect said fixed portions with said movable portions, wherein said joint regions have flat outer surfaces and curved inner surfaces opposite said flat outer surfaces said joint regions connecting said flexible thin portions to said fixed portions have thicknesses which increase in a direction from said flexible thin portions to said fixed portions,



said joint regions connecting said flexible thin portions to said movable portions having thicknesses which increase in a direction from said flexible thin portions to said movable portions, said load converter further comprising force-sensitive gauges attached to said flat outer surfaces of said joint regions formed substantially divergent toward said fixed portions and said movable portions such that said curved inner surfaces of joint regions have a radius of curvature of substantially no less than 2T, wherein T is a minimum thickness of said flexible thin portions.

4,586,578

ARTICULATED VEHICLE

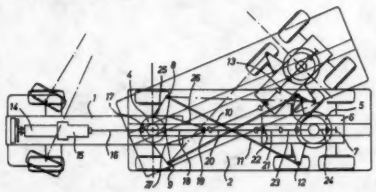
David P. Brown, Castle Eden, and John B. Brown, Durham County, both of England, assignors to Muiltidrive Limited, Peterlee, England

Filed Oct. 18, 1983, Ser. No. 542,999

Claims priority, application United Kingdom, Dec. 21, 1982, 8236327

Int. Cl.⁴ B62D *59/04*

U.S. Cl. 180—14.4 **4 Claims**



1. An articulated vehicle comprising:

a leading unit having a longitudinal centerline;

a trailing unit having a longitudinal centerline;

means to pivotally support the front end of said trailing unit on said leading unit for pivotal movement about a front pivot axis;

a sub-chassis having a longitudinal centerline at the rear of said trailing unit;

means to pivotally support the rear of said trailing unit on said sub-chassis for pivotal movement about a rear pivot axis;

control means operatively connected between said leading unit and said sub-chassis to control the pivotal movement of said sub-chassis by the turning of the leading unit so that the angle between the respective longitudinal centerlines of said sub-chassis and trailing unit is equal and opposite to

the angle between the respective longitudinal centerlines of said leading and trailing units;

an engine mounted on the leading unit;

a mechanism for communicating power between said engine and said sub-chassis comprising,

a front shaft mounted on said leading unit parallel to the longitudinal centerline thereof and operatively connected to said engine,

a rear shaft mounted on said sub-chassis parallel to the longitudinal centerline thereof,

an intermediate shaft between said front and rear shafts,

respective universal joints operatively connecting said intermediate shaft to said front and rear shafts so that said intermediate shaft is driven by said front shaft and drives said rear shaft, said universal joints being substantially equidistantly spaced from said front and rear pivot axes, the universal joint connecting said intermediate shaft to said front shaft having a central axis extending parallel to the longitudinal centerline of said leading unit, the universal joint connecting said intermediate shaft to said rear shaft having a central axis extending parallel to the longitudinal centerline of said sub-chassis, and

means to vary the length of said intermediate shaft during relative pivotal movement between said leading and trailing units;

a frame member pivotally mounted on said leading unit for pivotal movement about an axis transverse to a plane containing the longitudinal centerline of said leading unit and said front pivot axis; and

a bearing mounted on said frame member operatively supporting said front shaft so that said front shaft is pivotable about an axis parallel to said transverse axis.

4,586,579

STRUCTURE FOR REMOVABLY MOUNTING SUPPORT ROD FOR HOOD FOR MOTOR VEHICLE

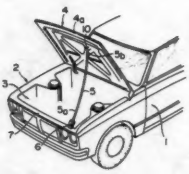
Tatsuhiko Matsui, Zama; Hiroyuki Aida, Hatano; Akira Watanabe, Mouka, and Tsuneyoshi Oohazama, Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited and Kato Hatsujo Kaisha, Limited, both of Yokohama, Japan

Filed Jul. 8, 1983, Ser. No. 512,016

Claims priority, application Japan, Aug. 9, 1982, 57-138262

Int. Cl.[4] B62D *25/10*

U.S. Cl. 180—69.21 **8 Claims**



1. A support device for supporting a closure member for closing an opening in the body of a motor vehicle, comprising:

a closure member pivotally attached to the body of the motor vehicle, wherein the closure member pivots between an open position in which the opening in the body is accessible, and a closed position in which the opening in the body is not accessible;

a support rod, having a base end and a free end, for supporting the closure member in the open position, wherein the support rod comprises an elastic resin material for creating an elastic restoring force when the rod is flexed to return the rod to the original non-flexed or straight state;

means for pivotally attaching the base end of said support rod to one of the closure member and the body of the motor vehicle;

a recess structure defining a recess having substantial rotational symmetry and having a symmetry axis, disposed on the other of the closure member and the body of the motor vehicle, and for engaging the free end of the support rod when said rod is supporting said closure member, wherein said recess structure is disposed with its symmetry axis oriented so that said support rod is only engaged when said free end is aligned with the symmetry axis and when said support rod is flexed; and wherein said elastic restoring force is created when the support rod is engaged by the recess structure and functions to force the free end of the support rod into the recess structure and create considerably great press-contact and frictional fit;

wherein said recess structure comprises an entrance portion, and a protuberance for engaging said support rod and disposed in said entrance portion; wherein said support rod comprises a notch for engaging said protuberance, and disposed substantially near said free end of said support rod; and wherein said protuberance engages said notch when the free end of the rod is aligned with the symmetry axis.

4,586,580

MOUNTING FOR POWER-ASSISTED MASTER BRAKE CYLINDER IN AN AUTOMOTIVE VEHICLE

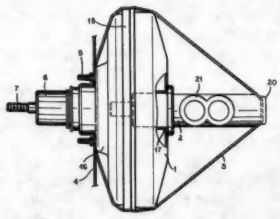
Norbert Spielmann; Udo Güssbacher, both of Ebern; Wolfgang Walther, Schorkendorf, and Hermann Bauer, Lülsfeld, all of Fed. Rep. of Germany, assignors to Fag Kugelfischer Georg Schafer & Co., Schweinfurt, Fed. Rep. of Germany

Filed Feb. 1, 1983, Ser. No. 462,775

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1982, 3203496

Int. Cl.[4] B62D *23/00*; B60T *13/00*

U.S. Cl. 180—89.1 **9 Claims**



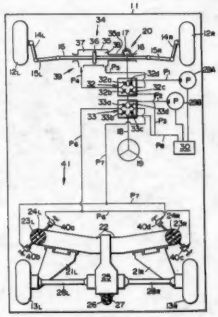
1. In an automotive vehicle having an engine compartment separated by a dashboard from the interior of the vehicle, a power cylinder on the engine side of the dashboard with an actuator linked by way of an aperture in said dashboard to a brake pedal on a driver's side thereof, and a master brake cylinder of lesser diameter coaxially adjoining said power cylinder in the engine compartment,

the combination therewith of a flexible retainer in said engine compartment reaching around and peripherally embracing said master brake cylinder and said power cylinder under tension for holding same together, said retainer passing around a free end of said master brake cylinder with extremities anchored to said dashboard on opposite sides of said aperture.

4,586,581
VEHICLE CONTROL SYSTEM

Yasuji Shibahata, Yokohama; Yasumasa Tsubota, Yokosuka, and Takaaki Uno, Zama, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Oct. 9, 1984, Ser. No. 658,604
Claims priority, application Japan, Oct. 15, 1983, 58-191701; Oct. 15, 1983, 58-193015; Oct. 15, 1983, 58-193017
Int. Cl.[4] B62D *5/06*
U.S. Cl. 180—140 **24 Claims**



1. A vehicle control system comprising:

a steering gear through which steering effort applied to a steering wheel is transmitted to steerable front wheels so as to turn the front wheels;

means for providing hydraulic fluid under pressure;

a control valve assembly including first and second control valves which are different in flow control characteristics from each other, said first and second control valves having first and second valve elements, respectively, which are drivingly connected with each other and movable in synchronism with each other in response to a vehicle operating parameter so as to control the hydraulic fluid from said hydraulic fluid providing means;

a power cylinder associated with said steering gear and fluidly connected to said first control valve so as to develop steering assist power for turning the front wheels; and

an actuator drivingly connected to a driven member for controlling a vehicle operation and fluidly connected to said second control valve so as to drive said driven member in response to the hydraulic fluid supplied to said actuator.

4,586,582
POWER STEERING SYSTEM WITH VEHICLE SPEED-SENSITIVE FLOW

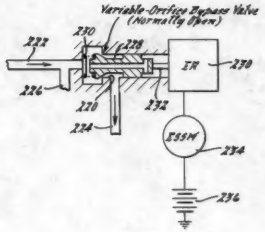
James J. Duffy, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 429,417, Sep. 30, 1982, Pat. No. 4,485,883. This application Aug. 20, 1984, Ser. No. 642,466
Int. Cl.[4] B62D *5/06*
U.S. Cl. 180—142 **5 Claims**

1. A power steering gear system for an automotive vehicle comprising a power steering pump and a fluid pressure operated steering gear;

passages connecting the pump and the steering gear including branch passage portions extending from the high pressure side of said pump to the low pressure side thereof;

a speed sensitive bypass valve means including a variable size orifice in said branch portions for controlling the flow bypassed from said high pressure side to said low pressure side and a constant flow valve means in said branch portions for regulating the flow bypassed from said high pressure side to said low pressure side whereby a constant volume of fluid delivered by said pump is bypassed to the said low pressure side when said bypass valve means is

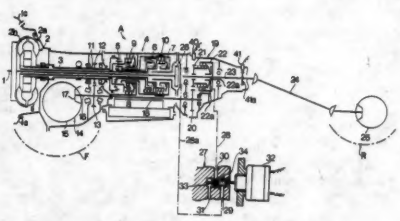


open, whereby a constant volume of fluid delivered by said pump is bypassed to said low pressure side at any given vehicle speed.

4,586,583
SYSTEM FOR CONTROLLING A POWER TRANSMISSION OF A FOUR-WHEEL DRIVE VEHICLE

Toru Yamakawa; Fujio Makita, both of Hachioji; Mitsuo Umezawa, and Ryuzo Sakakiyama, both of Tokyo, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 17, 1984, Ser. No. 651,545
Claims priority, application Japan, Sep. 19, 1983, 58-172667
Int. Cl.[4] B60K *23/08*
U.S. Cl. 180—247 **3 Claims**



1. An improved system for controlling a power transmission of a four-wheel drive vehicle powered by an engine having a transmission for transmitting the power of said engine to main driving wheels of said four-wheel drive vehicle, a clutch for transmitting said power to auxiliary driving wheels, circuit means for operating said clutch in accordance with driving conditions, wherein the improvement comprises:

first sensors for detecting speeds of said main and auxiliary driving wheels;

a second sensor for detecting depression of an accelerator pedal of said vehicle;

a third sensor for detecting depression of a brake pedal of said vehicle;

a fourth sensor for detecting a neutral position and a parking position of a shift lever of said transmission;

first means responsive to a large difference between said speeds of the wheels for engaging said clutch;

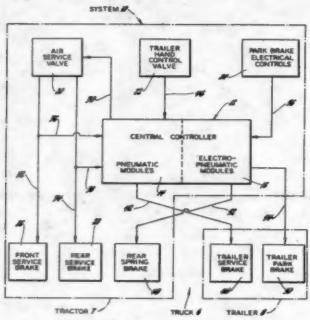
second means responsive to large acceleration and large deceleration dependent on the output of said first sensors for engaging said clutch respectively.

4,586,584

TRUCK BRAKE CONTROL SYSTEM

John T. Auman, Washington; Robert R. Luyckx, Troy; Harmahendar Singh, Sterling Heights, and Thomas W. Stockton, Ann Arbor, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 8, 1985, Ser. No. 720,873
Int. Cl.[4] B60D *1/12*; B60K *28/00*
U.S. Cl. 180—271 **3 Claims**



1. In a truck having an engine compartment, a chassis, brakes actuatable by air pressure for service braking and at least some of said brakes being also actuatable by force storage means for parking brakes in response to a predetermined decrease in air pressure supplied thereto and being releasable by air pressure selectively supplied thereto, a source of air under pressure, a plurality of air pressure reservoirs normally pressurized by air pressure from said source, air pressure control means controlling air actuating pressures for said brakes, other means powered by air pressure, and a cab mounted on said chassis, said cab having truck operator's station therein and an instrument panel; a truck air brake system comprising:

an air pressure distribution manifold having air passages therein and a plurality of control modules mounted thereon and connected to appropriate ones of said manifold air passages for receiving and controlling and directing the air pressures in said manifold, said manifold and said control modules defining a central controller mounted in said truck remotely from said engine compartment and said instrument panel and readily accessible for diagnostic and servicing operations;

said instrument panel having mounted thereon air pressure gauges having air lines connecting said gauges with appropriate air passages in said central controller and indicating air pressure conditions in different portions of said system, condition indicating means electrically connected with said central controller and indicating certain conditions existing in said system, and electrical parking brake controls electrically connected with said central controller for actuating the truck parking brakes by releasing air pressure at the truck parking brakes under control of said central controller and allowing said force storage means to exert parking brake actuating forces and for releasing the truck parking brakes by supplying air pressure to the truck parking brakes under control of said central controller;

one of said control modules comprising a supply valve module receiving pressurized air from said pressure source and distributing pressurized air to said plurality of reservoirs and said other means powered by air pressure, said supply valve module including means isolating said reservoirs and said other means from each other upon pressure failure of any of said reservoirs and said other means;

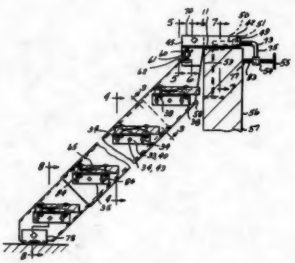
another of said control modules receiving signals from at least one of said electrical parking brake controls and acting in response thereto to actuate or release the truck parking brakes, said another module having means receiving pressures from said separate ones of air pressure reservoirs and selecting the higher received pressure for parking brake release.

4,586,585

LONGITUDINALLY EXTENSIBLE STRINGER AND STAIRWAY

Leonard A. Zaner, 1300 Jerry St., Madison Heights, Mich. 48071

Filed Aug. 15, 1985, Ser. No. 765,644
Int. Cl.[4] E06C *9/10, 7/48*
U.S. Cl. 182—97 **2 Claims**



1. A stringer means for a stairway comprising;

an elongated stair step stringer assembly having two generally |—| outlined elongated telescoping channels nesting slidably together including an outer channel member nesting in an inner channel member, both channel members having comparatively deep weight supporting flat side wall portions, and substantially shorter torsion resisting flanges, including a top flange and a bottom flange of generally equal length and of comparatively less width than the side wall depth and bent outwardly normal to the side walls;

each of said stringer side walls having registering groups of cylindrical bores therethrough aligned angularly and transversely between the top and bottom channel flanges and spaced longitudinally in uniform stair riser increments from each other, so that a plurality of groups of bores will register with another plurality of group of bores when the channel members are variably extended or shortened with respect to each other, and the line of the bores will assume a substantially horizontal position when the stringer is placed in an inclined position for climbing;

and step riser means associated with said stringer means including a plurality of angle iron like tread mounting brackets having a top tread flange and pre-formed bores in the other flange thereof for attaching the brackets pivotably to the inside wall face of the inside channel with the bracket bores registering with a group of channel bores, with one of the bracket bores acting as a pivot and another bracket bore being slotted to permit the bracket to be adjusted radially with respect to the stringer channels to maintain the horizontal position of the top tread flange with respect to the incline of of the stringer.

4,586,586

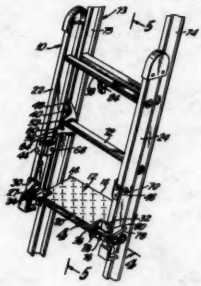
WORK-STEP FOR EXTENSION LADDER

Carlos Canals, 28 Nichols Ave., Brooklyn, N.Y. 11208

Filed Aug. 13, 1985, Ser. No. 765,129
Int. Cl.[4] E06C *1/12, 1/387*
U.S. Cl. 182—118 **6 Claims**

1. A work-step attachment adapted for use with an extension ladder, comprising a platform which is articulately secured to a ladder segment having first and second vertical side frames in

parallel relationship to each other and at least one horizontal rung extending therebetween and being connected at right angles to the vertical side frames, said rung being located beneath said platform and essentially in axial alignment therewith, the ladder segment further comprising hooking means fixedly secured to at least one of the vertical side frames, said hooking means being adapted to engage a run of an extension ladder, said ladder segment further comprising locking means



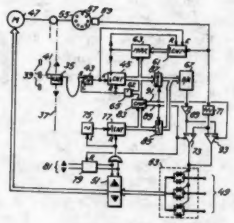
fixedly secured to at least one of the vertical side frames of said ladder segment and engageably connected to said platform, said locking means being capable of locking said platform in a first position in which it is in axial alignment with said rung, and in a second position in which it is substantially aligned in the plane of said parallel side frames, said work step attachment also including means for engaging an extension ladder to enable said work step attachment to be located along the length of said extension ladder.

4,586,587

ELEVATOR BRAKE CONTROL METHOD AND ARRANGEMENT

Alfredo Grossi, and Ricardo Grossi, both of Montes de Oca 675, Buenos Aires, Argentina

Filed Jun. 21, 1984, Ser. No. 622,838
Claims priority, application Argentina, Jun. 28, 1983, 293465
Int. Cl.[4] B66B *1/30*
U.S. Cl. 187—29 R **9 Claims**



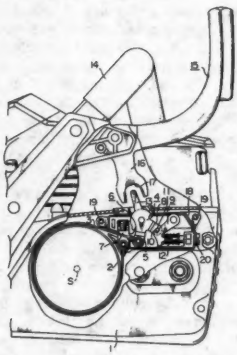
1. An electronic speed control arrangement for governing kinetic energy transfer means coupled to a mobile traveling along a guided path, said guided path including at least one control zone ending at a target location which said mobile must reach with predetermined speed by following a uniform deceleration pattern in said control zone regardless of the initial speed and potential energy with which said mobile enters said control zone, said control zone being partitioned into a plurality of segments of progressively decreasing spatial length and of approximately equal travel time according to said pattern; said speed control arrangement including sensor means responsive to entry of said mobile into said control zone to initiate deceleration of said mobile according to said pattern, transducer means responsive to movement of said mobile along said guided path to issue a pulse train having a repetition rate equal to the actual speed of said mobile, speed reference generator means connected to said transducer means to provide a reference speed signal as a predetermined function of the actual distance said mobile in said control zone is from said target location, and differential means for comparing said actual and reference speeds to obtain an error signal governing said transfer means; the improvement whereby said speed reference generator means comprise first counter means for receiving said pulse train from said transducer means to count pulses thereof and output an actual distance signal indicative of the progress of said mobile in one of said segments, counting capacity control means for uniformly decreasing the counting capacity of said first counter means each time said mobile reaches the end of a segment, and second counter means for counting a pulse each time the state of said first counter means reaches said counting capacity to output a uniformly decrementing reference speed signal towards said differential means, and to cause said counting capacity control means to vary the counting capacity of said first counter means according to the state of said second counter means.

4,586,588

CHAIN SAW SAFETY-BRAKE SYSTEM

Akira Nagashima, Kawasaki, and Toshio Taomo, Tokyo, both of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Jul. 26, 1984, Ser. No. 634,763
Claims priority, application Japan, Aug. 1, 1983, 58-140709
Int. Cl.[4] F16D *49/10*
U.S. Cl. 188—77 R **1 Claim**



1. A chain saw safety-brake system on a chain saw with a front handle comprising:

a pivotable member including an arm disposed in spaced-juxtaposed relation to a lower end portion of a brake lever of a brake handle pivotably connected to the front handle and actuated by the brake lever as it is moved pivotally, one leg of a bifurcation of the pivotable member connected to one end of a brake band trained over an outer periphery of a clutch drum of a centrifugal clutch for driving a saw chain, and the other leg of the bifurcation kept from moving in pivotal movement by a lock lever;

a screw located in side-by-side relation to the pivotable member and connected to the other end of the brake band

a casing containing the pivotable member, the lock lever and the screw in an assembled condition to provide a packaged unit detachably secured to the chain saw,

said screw positioned for manipulation from outside of said casing to adjust the length of said brake band.

4,586,589

AUTOMATIC BRAKING GAP ADJUSTOR SYSTEM FOR MECHANICAL TYPE DRUM BRAKE

Isao Idesawa, Nagano, Japan, assignor to Nisshin Kogyo Kabushiki Kaisha, Japan

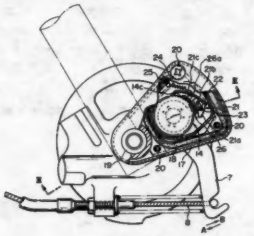
Filed Aug. 25, 1983, Ser. No. 526,328

Claims priority, application Japan, Aug. 31, 1982, 57-131701[U]; Aug. 31, 1982, 57-131702[U]; Aug. 31, 1982, 57-131703[U]; Apr. 7, 1983, 58-51690[U]

The portion of the term of this patent subsequent to Jan. 22, 2002, has been disclaimed.

Int. Cl.[4] F16D *65/60*

U.S. Cl. 188—79.5 K 5 Claims



1. An automatic braking-gap adjuster system for mechanical drum brakes, including a back plate, a pair of brake shoes each having one end pivotally supported on the back plate, an elongated cam member interposed between the other end of the brake shoes and adapted to be rotated about an axis by a brake arm in an actuation direction, said cam member having an axial tapered groove therein, a cam collar axially slidingly fitted into said groove and abutting onto the other end of said brake shoes, an adjusting bolt axially and threadedly inserted into said cam member with the head of said bolt bearing against the end of said cam collar, an adjusting gear disposed to be rotatable with said adjusting bolt, an adjusting lever fixed at one end thereof to said cam member to rotate therewith and having a resilient pawl portion at the other end thereof to engage with said adjusting gear at a first position, a fixed support pin extending parallel to the rotation axis of said cam member, a stopper lever supported at one end portion thereof on said support pin to be movable in the actuation direction of said cam member and a pawl portion at a location remote from said one end portion and engaging said adjusting gear in such a manner that said gear is restrained from turning in the actuation direction of said cam member, and a spring member to bias said stopper lever in the counter-actuation direction of said cam member, whereby when the abrasion of brake linings mounted on said shoes reaches a predetermined value, said adjusting lever engages with said adjusting gear at another position and said cam member rotates relative to said adjusting bolt thereby causing said cam collar to move outwardly against said shoes.

4,586,590

ADJUSTABLE VEHICLE BRAKE PROPORTIONING SYSTEM

Paul E. Rishel, Mt. Clemens; Allan D. LaGrou, Rochester, and Thomas E. Seefried, Washington, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 4, 1985, Ser. No. 697,770

Int. Cl.[4] B60T *11/08*

U.S. Cl. 188—345 1 Claim

1. An adjustable vehicle brake proportioning system comprising:

mounting means secured in fixed relation in a vehicle to be braked;

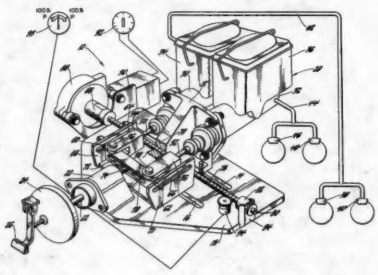
a guide plate and mount slidably mounted with respect to said mounting means for transverse movements;

first and second master cylinders mounted with respect to said guide plate and mount in axially parallel relation and having input push rods, said master cylinders being adapted to be respectively connected to front and rear wheel brake cylinders;

a balance bar slidably mounted with respect to said guide plate and mount for sliding movement relative thereto substantially perpendicular to the transverse movements of said guide plate and mount;

means connecting one of the ends of said balance bar to one of said master cylinder input push rods and the other of the ends of said balance bar to the other of said master cylinder input push rods in actuating force transmitting relation;

an input member slidably mounted with respect to said mounting means and slidably engaging said balance bar in transverse relation thereto, said input member operably



receiving brake actuating forces and transmitting same to said balance bar, the range of engagement of said input member with said balance bar being substantially from the connecting means at the one balance bar end to the connecting means at the other balance bar end;

and means for selectively moving said guide plate and said balance bar and said master cylinders transversely on said mounting means, selecting and establishing a desired ratio between the distances from the point of engagement of said input member with said balance bar and each of the ends which establishes the same ratio of the actuating forces transmitted to actuate each of said master cylinders to vary the brake actuating pressures from said master cylinders to said front and rear wheel brake cylinders accordingly within a range of substantially 100% front pressure and 0% rear pressure to substantially 100% rear pressure and 0% front pressure.

4,586,591

PRESSURE-FLUID-OPERABLE VEHICLE BRAKE SYSTEM

Juan Belart, Walldorf, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Oct. 9, 1984, Ser. No. 659,302

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1983, 3338322; Oct. 22, 1983, 3338514

Int. Cl.[4] B60T *8/00, 11/20, 13/14;* F15B *7/08*

U.S. Cl. 188—358 3 Claims

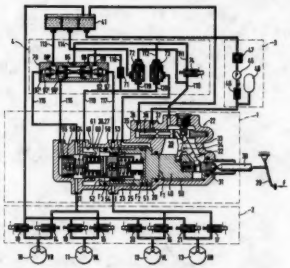
1. A pressure-fluid-operable vehicle brake system in which the pressure buildup in a master brake cylinder is augmented by an auxiliary energy source the latter of which is susceptible to failure, said brake system comprising, in combination:

a master cylinder having a cylinder housing forming a pressure fluid chamber;

a brake-actuated movable piston slidably mounted in said chamber of said housing, said movable piston having a stepped configuration including a first end portion defining a first piston area which is larger than a second end portion defining a second piston area and wherein said

chamber is divided into first and second chambers respectively enclosing said first and second end portions of said movable piston and wherein said first piston area normally provides the effective area of said movable piston;

an auxiliary energy source connected to said first chamber of said housing for further translating said movable piston in response to brake actuation;



means for detecting a failure of said auxiliary energy source; and,

means responsive to said means for detecting a failure for interconnecting said first and second chambers upon said failure of said auxiliary energy source wherein the effective area of said movable piston reduces to said second piston area.

4,586,592

POWER CHANGE-OVER MECHANISM OF A VEHICLE FOR INDUSTRIAL MACHINERY

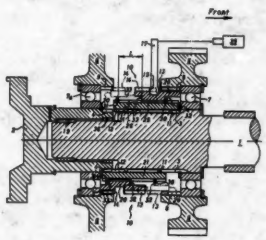
Mituyoshi Mori, Hirakata, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Japan

Filed Jul. 3, 1984, Ser. No. 627,579

Claims priority, application Japan, Jul. 6, 1983, 58-123589

Int. Cl.[4] F16D *21/08*

U.S. Cl. 192—49 **8 Claims**



1. A power change-over mechanism of a vehicle for industrial machinery including a first driving shaft and a second driving shaft arranged on the same axis center, a high-speed gear and a low-speed gear fitted in said first and second driving shafts respectively, splines formed on said both shafts and both gears, a power change-over annular spool disposed between the both gears freely slidingly operably in the axial direction, splines formed on said spool, the low-speed gear being interconnected through the spool to the first and second driving shafts when the spool is at a four-wheel drive position, and the high-speed gear being interconnected through the spool to the first driving shaft when the spool is at a two-wheel drive position; characterized in that the spool comprises an outer peripheral side member having splines meshing freely with the splines of said gears, an inner peripheral side member having splines meshing freely with the splines of said driving shafts, said outer peripheral and said inner peripheral side members are spline connected to each other and are relatively movably in the axial direction and at the same time, and a stopper mechanism limiting said axial movement within a prescribed range, and that said power change-over mechanism further includes an urging means for moving the outer peripheral side member in a desired direction of operation to obtain said drive positions.

4,586,593

DRIVE ASSEMBLY

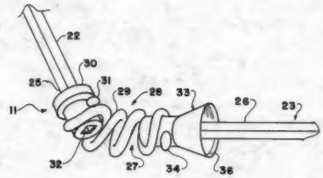
Terry L. Danelson, Box 154, R 33, and Barry J. Harmon, Box 965, both of Scobey, Mont. 59263

Filed Jun. 7, 1982, Ser. No. 386,014

The portion of the term of this patent subsequent to Oct. 8, 2002, has been disclaimed.

Int. Cl.[4] A01B *39/19*; F16D *11/00*

U.S. Cl. 192—67 R **3 Claims**



1. A separable drive assembly including first and second shafts, said shafts being normally aligned axially in an end to end relationship and being pivotably separable from one another, a coupling portion selectively operatively connecting adjacent ends of said first and second shafts, said coupling portion including a resilient section including a coil spring, a connector section extending from one end of said resilient section, said connector section including a first axial bore therethrough, said adjacent end of said first shaft engaging and being affixed within one end of said first axial bore, a guide section extending from an opposite end of said resilient section, said guide section including an enlarged generally conical end section remote from said resilient section, a second axial bore extending through said guide section, an adjacent end of said second shaft being capable of slidable engagement with said conical end section and said second axial bore within said guide section, said axial bore adjacent said conical end section having a cross section with a plurality of sides substantially the same as the cross-sectional configuration of said second shaft but slightly larger to fix said second shaft against rotation with respect to said coupling portion; whereby moving said adjacent first and second shaft ends toward each other will cause the end of said second shaft to slidably engage said second axial bore within said guide section of said coupling portion to operatively connect said first and second shafts in a drive assembly.

4,586,594

CLUTCH ASSEMBLY CAPABLE OF BEING ENGAGED BY FLUID PRESSURE DEPENDING ON CENTRIFUGAL FORCE

Jacques Duminy, Crailsheim, Fed. Rep. of Germany, assignor to Voith Turbo GmbH & Co. KG, Crailsheim, Fed. Rep. of Germany

PCT No. PCT/EP82/00077, § 371 Date Jan. 12, 1983, § 102(e) Date Jan. 12, 1983, PCT Pub. No. WO82/04107, PCT Pub. Date Nov. 25, 1982

PCT Filed Apr. 2, 1982, Ser. No. 459,536

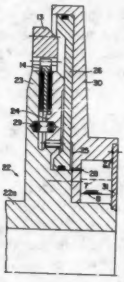
Claims priority, application Fed. Rep. of Germany, May 14, 1981, 3119171

Int. Cl.[4] F16D *25/06*

U.S. Cl. 192—103 FA **11 Claims**

1. A rotary clutch assembly, comprising two functional

clutch halves, at least two cooperating friction surface means for drivingly engaging and disengaging said two functional clutch halves, actuating fluid for co-axial rotation with one of said two functional clutch halves, wherein the engaging pressure on said cooperating friction surface means is achieved by fluid pressure generated by centrifugal force exerted on said actuating fluid as said actuating fluid undergoes rotation with said one of said two functional clutch halves, said clutch assembly further comprising pressure applying actuator mans for at times applying said engaging pressure to said friction surface means as to thereby drivingly engage said two functional clutch halves to each other, said actuator means being rotatable with said one of said functional clutch halves and axially movable with respect to said one of said functional clutch halves, a pressure chamber carried by said one of said functional clutch halves and rotatable therewith, said pressure chamber being fillable with said actuating fluid, wherein upon rotation of said one of said functional clutch halves the pressure of said actuating fluid within said pressure chamber increases depending upon its centrifugal force and upon attainment of a preselected rotational speed of said one of said functional clutch halves is sufficient to cause said actuator means to move axially and achieve driving engagement of said two functional clutch halves, a reservoir chamber provided within said one of said functional clutch halves and located as to be



both separate from and spaced from said pressure chamber and said actuator means, said actuating fluid being received by said reservoir chamber during periods when said two functional clutch halves are operatively disengaged from each other, fluid conduit means operatively interconnecting said pressure chamber to said reservoir chamber, said reservoir chamber being effective to receive said actuating fluid from said pressure chamber when said two functional clutch halves are operatively disengaged from each other, said reservoir chamber being located nearer to the axis of rotation of said rotary clutch assembly than is said pressure chamber, said pressure chamber comprising a continuous radially outer surface circumferentially containing said actuator means, and fluid throttling means continuously rotatable in unison with said one of said functional clutch halves and effective to control the flow of said actuating fluid from said reservoir chamber to said pressure chamber for causing said two functional clutch halves to become drivingly engaged with each other, wherein said reservoir chamber is formed as to be separated from said actuator means, wherein said pressure chamber comprises axially spaced end faces, wherein one of said axially spaced end faces is carried by said actuator means, and wherein said end faces match each other in such a way that when said two functional clutch halves are fully disengaged from each other the volume of said pressure chamber assumes nearly the value of zero.

4,586,595

CLUTCH DISC UNDER-TOAD AND IDLING DAMPING MEANS

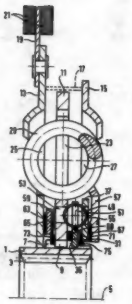
Franz Hartig, Dittelbrunn, and Dagwin Tomm, Kaiserslautern, both of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Fed. Rep. of Germany

Filed Dec. 11, 1984, Ser. No. 680,391

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1983, 3345409

Int. Cl.[4] F16D *3/14*

U.S. Cl. 192—106.2 **15 Claims**



1. A clutch disc for a motor vehicle friction disc clutch, comprising

(a) a hub provided with an external toothing and defining an axis of rotation;

(b) two hub discs coaxially surrounding the hub in annular form, of which a first hub disc carries on its internal circumference an internal toothing which engages in the external toothing and couples the first hub disc non-rotatably but with predetermined play in rotation with the hub and of which a second hub disc is held non-rotatably on the hub substantially without play in rotation;

(c) two first side discs arranged on axially opposite sides of the first hub disc, which are connected to form a unit mounted on the hub rotatably in relation to the hub and the first hub disc;

(d) several first damping springs arranged on a common diameter circle in windows of the first hub disc and the first side discs and stressable in the relative rotation, in operation under load, between the first hub disc and the first side discs;

(e) at least on one side of the second hub disc a second side disc rotatable in relation to the second hub disc;

(f) at least one second damping spring arranged radially between the external toothing of the hub and the diameter circle on which the first damping springs are arranged, in windows of the second hub disc and every second side disc, stressable in the relative rotation between the second hub disc and every second side disc, and dimensioned for idling operation; and

(g) clutch friction linings connected with the unit of the first side discs;

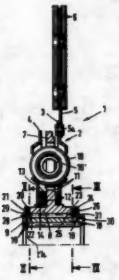
(h) the second hub disc, every second side disc and every second damping spring being arranged axially between the first hub disc and one of the two first side discs;

(i) every second side disc being connected non-rotatably with the first hub disc.

4,586,596
CLUTCH PLATE WITH A COMPOSITE TORSION DAMPING HUB

Christoph Schmid, Wooster, Ohio, assignor to Luk Lamellen und Kupplungsbau GmbH, Bühl/Baden, Fed. Rep. of Germany

Filed Mar. 23, 1983, Ser. No. 478,111
Int. Cl.[4] F16D *3/14*
U.S. Cl. 192—106.2 **12 Claims**



1. A clutch plate, particularly for use in the friction clutch of an automotive vehicle, comprising a hub including coaxial inner and outer sections respectively having external and internal teeth which mate with limited freedom of angular movement of said sections relative to one another; means for holding said sections against axial movement with reference to one another, including first and second stops provided on said inner section and flanking said outer section, each of said stops having a first surface and said outer section having second surfaces adjacent to the respective stops, said holding means further including an annular retainer having at least one tooth meshing with the neighboring external teeth of said inner section, said retainer abutting against one of said first and second surfaces; and friction generating means for yieldably opposing angular movements of said sections with reference to one another, including a first friction disc interposed between said first stop and said outer section and having at least one tooth meshing with the neighboring external teeth of said inner section, and resilient means bearing directly against said friction disc and reacting against said retainer to urge said friction disc toward the other of the respective first and second surfaces, said friction generating means further including a second friction disc interposed between said second stop and said outer section.

4,586,597
APPARATUS FOR FEEDING PLATELIKE WORKPIECES TO A TOOL STATION OF A MACHINE TOOL

Wolfgang Wögerer, Liebenau, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Jan. 18, 1985, Ser. No. 692,526
Claims priority, application Austria, Feb. 10, 1984, 428/84
Int. Cl.[4] B65G *21/20*
U.S. Cl. 198—345 **14 Claims**

1. In apparatus for feeding a platelike workpiece to and from a tool station of a machine tool, comprising

a frame,

a straight track carried by said frame and extending in a first direction,

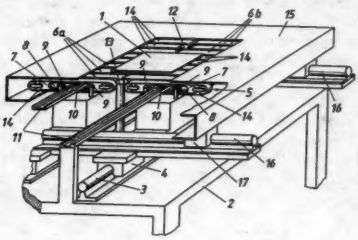
a carriage carried by said frame and movable along and guided by said track, and

transverse conveying means carried by said carriage and adapted to support a workpiece and operable to move said workpiece in a direction of travel, which is transverse to said first direction,

the improvement residing in that

said transverse conveying means comprise at least one pair of revolvable endless conveyors, which are arranged one behind the other in said direction of travel and have an upper course each,

spacing means are provided for holding said endless conveyors of said pair spaced apart in said direction of travel, and

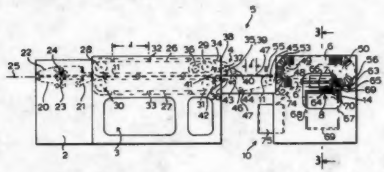


position control means are provided for revolving said endless conveyors and for holding said upper courses of said endless conveyors of said pair against a movement relative to each other in said direction of travel.

4,586,598
METHOD AND APPARATUS FOR DELIVERING ARTICLES FROM A HIGH-SPEED PRODUCTION MACHINE

Günter Ehlscheid, and Klaüs Münsch, both of Neuwied, Fed. Rep. of Germany, assignors to Winkler & Dunnebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG, Neuwied, Fed. Rep. of Germany

Filed Feb. 22, 1985, Ser. No. 704,218
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1984, 3409662
Int. Cl.[4] B65G *37/00*
U.S. Cl. 198—356 **12 Claims**



6. Apparatus for delivering articles for packaging from a high-speed production machine for the manufacture of sanitary articles, such as sanitary napkins, tampons or the like, comprising:

(a) a swiveling device having a top and bottom chain driven synchronously with the speed of the production machine, said chains having rotating dishes arranged thereon with a spacing synchronized with the operating cycle of the production machine;

(b) a pulling device for transporting the articles from the swiveling device;

(c) a regulating device operating at a greatly reduced transport speed, said device having regulating chains and drivers arranged thereon with reduced spacings in the timed sequence, said reduced spacings in the timed sequence conforming to a lower transport speed;

(d) a revolving compartment chain rotating around horizontal reversing axles, said compartment chain consisting of two chains running in parallel and connected to each other by means of crossties, drivers being arranged on said crossties vertically to the plane of the chain, said drivers forming pockets for receiving the articles;

(e) a pushing device mounted on the reversed lower strand

of the compartment chain with two controllable rotary wings arranged counter-rotatably and at right angles to said compartment chain with their axes of rotation extending parallel to said compartment chain, said rotary wings having an approximately S-shaped and inversely S-shaped cross section, whereby the articles are pushed from the compartment chain in counted numbers by closed sides of the rotary wings by the controlled rotary motion of said wings;

(f) a depositing table with a transverse conveying facility for receiving said articles in counted numbers from said rotary wings; and

(g) a depositing station for receiving rejects, said station being comprised of a baffle plate and a collecting container.

4,586,599

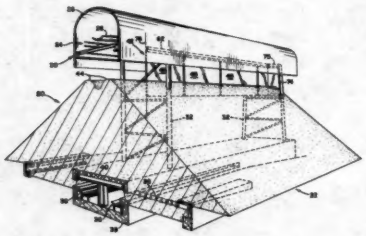
METHOD AND APPARATUS FOR PREVENTING AIR POLLUTION BY THE ENTRAINMENT OF PARTICULATE MATERIAL

Wally Z. Walters, c/o Preco Corporation, Front St., West Springfield, Mass. 01089

Filed Oct. 20, 1983, Ser. No. 543,774

Int. Cl.[4] B65G *21/00, 47/38*

U.S. Cl. 198—364 **11 Claims**



1. A particulate material handling system which is capable of reducing the pollution of air by the entrainment of particulate solids, said system comprising: a covered elevated conveyor means from which the particulate material can be deposited to form a pile of that material in a designated area or to add to such a pile and air diversion means which is adapted to so cooperate with said conveyor as to prevent wind from entraining fines in the particulate material as it is dumped onto the pile or into said area and to prevent wind from stripping and entraining material from the pile by diverting said wind upwardly over the top of said elevated conveyor means and creating an eddy in the air on the leeward side of the pile of particulate material, whereby particulate material entrained in the air diverted over the elevated conveyor means will drop out of the air currents in the region where the eddy currents are formed and be deposited on the leeward side of the pile, said air diversion means being vertically oriented and adapted to extend lengthwise along at least the initial segment of said pile and essentially along the longitudinal centerline thereof, said air diversion means having a lower edge which is adapted to be proximate to, in contact with, or buried in said pile depending on the height of the pile, and said conveyor being so constructed that it is capable of depositing particulate material on both sides of said air diversion means.

4,586,600

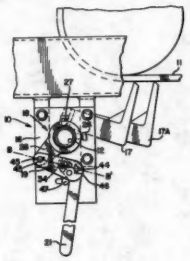
CONVEYOR BELT CLEANER TENSIONING DEVICE

Michael J. Lindbeck, Neponset, Ill., assignor to Martin Engineering Company, Neponset, Ill.

Filed Jan. 4, 1985, Ser. No. 688,735

Int. Cl.[4] B65G *45/00*

U.S. Cl. 198—499 **3 Claims**



1. A tensioning arrangement for a conveyor belt cleaner including a support shaft mounted for rotation about a first axis and disposed transverse to the direction of conveyor belt travel, one or more belt cleaner blades mounted on said support shaft adapted, in a first position, to contact the surface of said belt and adapted, in a second position, to be out of contact with said belt, a crank element having a hub connectable to said shaft for rotation therewith and a radially extending arm, a handle pivotally mounted for rotation about a second axis, link means connectable between said arm of said crank and said handle and means to interconnect said handle, said link, and said arm of said crank in an over-center camming arrangement such that upon rotation of said handle in a belt-engaging direction, said blade will engage said belt and upon further rotation of said handle in the same direction, said blade will be positively locked in place for either direction of conveyor belt travel.

4,586,601

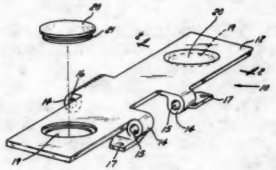
MAGNETIZED CONVEYOR AND CHAIN LINKS

Wasyly G. Hodlewsky, Greendale, Wis., assignor to Rexnord Inc., Brookfield, Wis.

Filed Sep. 26, 1980, Ser. No. 191,477

Int. Cl.[4] B65G *17/46*

U.S. Cl. 198—690.1 **3 Claims**



1. A chain link, comprising:

a substantially flat article carrying portion having at least one aperture therein;

two legs integrally depending from said article carrying portion, each of said legs having a hole therein for insertion of a pin;

a flexible magnetic grommet positioned in said aperture for attracting ferro magnetic articles, including a substantially flat top portion, a small-diameter central portion, and a tab portion, wherein said top and tab portions have a larger outside diameter than the smallest internal diameter of said aperture, such that said grommet may be inserted into said

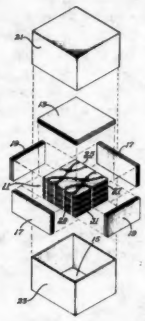
aperture by deforming said tab portion until it passes through the smallest internal diameter of said aperture so that said grommet may be retained in said aperture by the larger diameter tab and top portions.

4,586,602

DETONATING CORD TRANSPORT SYSTEM

David V. Levey, Joshua, Tex., assignor to Pengo Industries, Inc., Fort Worth, Tex.

Filed Jan. 18, 1985, Ser. No. 692,896
Int. Cl.[4] B65D *81/02, 85/30, 85/62*
U.S. Cl. 206—3 **27 Claims**



1. A detonating cord transport package comprising a plurality of sections, with each section comprising:

a. a detonating cord separator-support member having front and back face surfaces and edge surfaces;

b. a continuous length of detonating cord disposed for support on said separator-support member and traversing portions of said surfaces such that there are a plurality of crossover locations on said front face surface where a second detonating cord portion crosses over a first detonating cord portion;

c. severing means interposed between said first and second detonating cord portions at each of said crossover locations; and,

d. retainer means maintaining said severing means in abutting relation with respect to said detonating cord first and second portions and restraining said detonating cord first and second portions against movement away from said front face surface.

4,586,603

DISK STORAGE CONTAINER AND DISPLAY DEVICE

Jerry M. Long, Pleasanton, and James A. Womack, Los Gatos, both of Calif., assignors to Innovative Concepts, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 322,968, Nov. 19, 1981, Pat. No. 4,508,217. This application Apr. 30, 1984, Ser. No. 605,280
The portion of the term of this patent subsequent to Apr. 2, 2002, has been disclaimed.
Int. Cl.[4] B65D *5/50*
U.S. Cl. 206—45.18 **5 Claims**

1. A storage and display unit for floppy disks and the like, which comprises:

a bottom portion including receptacle forming means for providing a receptacle having a floor and walls extending upwardly from the periphery of said floor for providing an open container, said bottom portion including

a substantially rectangular base the upper surface of which provides said floor;

a pair of side walls disposed along opposite edges of said base, each said side wall including a support arm pivot projection;

a front wall which has a slight inward slope from the junction of said base to said top edge which terminates at a height that i lower than said side wall; and

a back wall that is about one-half height of said side walls;

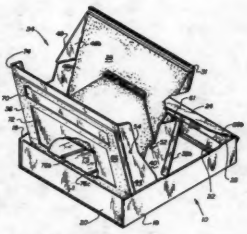
a support arm pivotally attached to said upwardly extending walls and arranged for extending inwardly toward the center of said container, said support arm including

a link member that is substantially flat and includes support tabs and a locking means at the distal end thereof;

a downwardly extending end wall at the proximal end, said end wall being sized so as to be adjacent the back wall of said bottom portion when the container is closed; and

a pair of oppositely disposed downwardly extending side wall portions formed with said end wall, each said side wall portion including a pivot aperture to mate with an associated one of said support arm pivot projections, whereby said link member is pivotally attached to said base portion and;

a storage portion including



an upper part hingedly attached to the distal end of said support arm at a point thereon spaced from the upper periphery of said receptacle forming means, said upper part including,

a top surface including a recessed area adapted to accomodate the major part of said link member when said container is in its closed condition, and a locking member adapted to accept said support arm locking means, whereby they are hingedly connected; and a pair of oppositely disposed downardly extending side walls each of which includes a substantially rectangular section and a substantially triangular section formed therewith, and each side wall including a plurality of detent projections and a pivot projection for pivotal interconnection with said lower part;

a lower part pivotally connected to said upper part at a point spaced from the attachment of said upper part to said support arm and arranged for rotation between a position common to said upper part and a position extending away said upper part;

said storage portion being arranged for rotation relative to and in cooperation with said support arm between a position within said receptacle forming means and a position away from said receptacle forming means.

4,586,604

CULTURE COLLECTION INSTRUMENT AND SEALED SWAB HOLDER THEREFOR

Richard R. Alter, Delavan, Wis., assignor to Continental Plastic Corporation, Delavan, Wis.

Filed Jun. 28, 1984, Ser. No. 626,210
Int. Cl.[4] A61D *10/00;* **B65D** *81/24*
U.S. Cl. 206—210 **9 Claims**

4. A culture collection instrument for inserting into the cervix of an animal for culturing of an animal including in combination;

an elongated rod having a swab element mounted on the end thereof;

an inner tubular swab protector element adapted to receive said elongated rod and said swab element thereon and adapted for relative movement therebetween;

an outer tubular sheath protector housing adapted to receive said inner tubular swab protector element and permit relative longitudinal movement therebetween, and a shield protector element mounted to the distal end of said outer tubular sheath protector housing and wherein said closed end portion of said shield protector element is scored to provide a break away membrane when said

closed end of the shield protector is engaged by the end of said inner tubular swab protector element when the instrument is inserted into the cervix of the animal;

wherein said inner tubular swab protector element includes a scored portion thereof intermediate the ends thereof which permits a predetermined breaking of said inner tubular swab protector element and said swab element from said elongated rod to provide a tubular holder for the cultured swab element; and

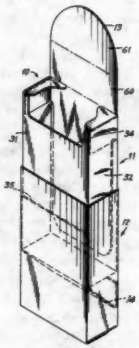
capping means engageable with both of said ends of said tubular holder defined by said protector element to provide a sealed and sanitary holder for the cultured swab element.

4,586,605

CIGARETTE PACK

Reginald W. Newsome, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Jun. 7, 1985, Ser. No. 742,710
Int. Cl.[4] B65D *85/10*
U.S. Cl. 206—267 **11 Claims**



1. A cigarette pack comprising:

an inner sleeve member, said inner sleeve member having a solid rectangular shape, and having a height substantially the length of a cigarette, a width approximately an integral multiple of the diameter of a cigarette, and a depth sufficient to accommodate a plurality of rows of cigarettes, said inner sleeve member further having a front wall and a back wall each defined by said height and said width, a bottom wall defined by said width and said depth, and first and second side walls each defined by said height and said depth, said front wall having a cutout portion at the top thereof forming an opening through which cigarettes may be withdrawn;

an outer sleeve member having front, back, and bottom walls and first and second side walls telescoped about said inner sleeve member, such that said inner sleeve member protrudes sufficiently from the top of said outer sleeve member for said inner sleeve member to be grasped;

a tab member having a top portion and a front portion; and

a retaining member; wherein

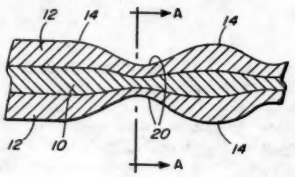
a portion of said tab member is adhered to a portion of said inner sleeve member, said front portion of said tab member being positioned between said inner and cuter sleeve members covering said cutout portion when said inner sleeve member is fully retracted within said outer sleeve member, such that said cigarette pack is closed, and being free to move when said inner sleeve member is at least partially withdrawn from said outer sleeve member, such that said cigarette pack is open, said retaining member preventing said inner sleeve member from being completely withdrawn from said outer sleeve member.

4,586,606

NONWOVEN FABRIC

Jon A. Howey, Mansfield, Mass., assignor to The Kendall Company, Boston, Mass.

Filed Oct. 28, 1983, Ser. No. 546,785
Int. Cl.[4] B65D *85/30*
U.S. Cl. 206—313 **15 Claims**



1. A computer diskette liner material comprising; an inner layer of substantially low melting point thermoplastic fibers, and at least one outer layer of predominately non-thermoplastic textile length fibers, said inner and outer layers thermally bonded together only in a plurality of recessed discrete bonding points.

4,586,607

FLEXIBLE STRIP OF ENCAPSULATED CONTACT MEMBERS

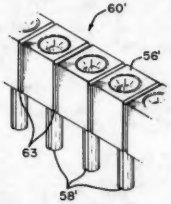
Jack F. Dubbs, Harrisburg, and Clyde K. Hanyen, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 453,310, Dec. 27, 1982, abandoned.
This application Dec. 17, 1984, Ser. No. 682,480
Int. Cl.[4] B65D *73/02*
U.S. Cl. 206—329 **4 Claims**

1. A strip of spaced apart electrical sockets, each socket having a contact section and a mounting section at an end of the socket opposite the contact section; the mounting section being mountable within a hole in a circuit board for electrical connection to an electrical conductive area on the circuit board and the contact section being electrically connectable with an electrical conductor or electrical terminal member; said strip comprising:

elastomeric material secured onto and completely encapsulating said contact sections of said electrical sockets in the form of flexible insulation members having oppositely-facing sidewalls and oppositely-facing end walls which are integral with oppositely-facing end walls of adjacent flexible insulation members thereby forming a continuous strip

of electrical sockets such that the center-to-center spacing between the electrical sockets is such to enable the mounting sections of the electrical sockets to be mass inserted into respective holes of the circuit board and the electrical



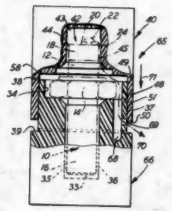
conductors or electrical terminals to penetrate through top surfaces of the insulation members and make electrical connection with the contact sections with the insulation members sealingly engaging the conductors or terminals.

4,586,608

CONTAINER FOR AND METHOD OF ENCLOSING AN ARTICLE

Charles R. Fegley, Laureldale, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 25, 1984, Ser. No. 623,899
Int. Cl.[4] B65D *73/02*
U.S. Cl. 206—334 **6 Claims**



1. A container for enclosing an article and for controlling air enclosed with the article, comprising:

a base having interior means for holding an article with a first portion of the article protruding from a loading end of the base, said base having peripheral surfaces extending over a first distance from the loading end to cover terminating means on the base, such surfaces being provided primarily for engaging cooperative surfaces for closing and for substantially hermetically sealing the container, there being at least one passageway extending from the interior holding means to a port at a peripheral engaging surface for passing air from the article in the container; and

a cover having an interior cavity for closing over the first portion of the artice in a desired manner, said cover having peripheral walls containing free ends and fixed ends with internal surfaces therebetween for engaging the engagement surfaces of the base, wherein

said engagement surfaces of said base and cover having a sufficiently close fit and said cover peripheral walls being sufficiently long that said cover substantially aligns to the base and stays clear of the article during closure such that unwanted contact of the cover to the first portion of the article is avoided, and

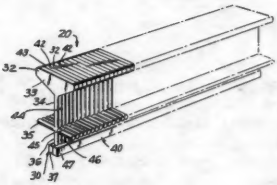
said port being open during at least a portion of the engaging of the engagement surfaces of the base by the engagement surfaces of the cover, said port passing air trapped within the container until the free ends of the cover peripheral walls are moved over and the cover surfaces close over said port.

4,586,609

TAG PIN FASTENER ASSEMBLY AND METHOD

Yong K. Won, Seoul, Rep. of Korea, assignor to Ben Clements & Sons, Inc., South Hackensack, N.J.

Filed Jan. 18, 1985, Ser. No. 692,734
Claims priority, application Rep. of Korea, Jan. 21, 1984, 259
Int. Cl.[4] B65D *85/24*
U.S. Cl. 206—343 **19 Claims**



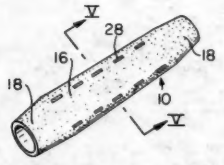
1. A tag pin fastener assembly comprising a first tag pin assembly member having a first connecting rod and a plurality of tag pins coupled to said first connecting rod in a predetermined spacing, a second tag pin assembly member having a second connecting rod and a plurality of tag pins coupled to said second connecting rod in a predetermined spacing, and coupling means for coupling said first connecting rod directly to said second connecting rod so that said tag pins on said first rod are alternately arranged with the tag pins on said second rod to form a complete tag pin fastener assembly.

4,586,610

WIRE MARKER SLEEVE AND ASSEMBLY

Paul J. Gandolfo, Parsippany, N.J., assignor to Thomas & Betts Corporation, Raritan, N.J.

Filed Feb. 8, 1985, Ser. No. 699,623
Int. Cl.[4] B65D *85/20, 63/00*
U.S. Cl. 206—485 **22 Claims**



16. A wire marker sleeve assembly comprising:

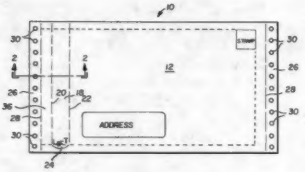
a plurality of longitudinal wire marker sleeves, each having a longitudinally bonded and flattened central extent and unflattened extents at the opposite ends thereof; and

a sleeve holding device comprising a flat planar member having two opposed planar surfaces, said holding device including a plurality of elongate openings through said planar surfaces accommodating therein said wire marker sleeves; said holding device further including adjacent each opening a pair of spaced inwardly directed tabs, extending into the unflattened end extents of said sleeves to retentively support said sleeves in said opening.

4,586,611
BUSINESS MAILER

Arthur C. Scalzo, Irondequoit, N.Y., assignor to Specialized Printed Forms, Inc., Caledonia, N.Y.

Filed Jun. 10, 1985, Ser. No. 743,099
Int. Cl.[4] B65D *27/38*
U.S. Cl. 206—610 **9 Claims**

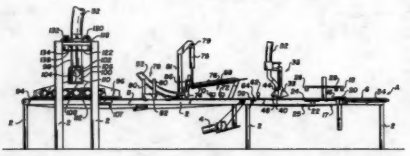


1. An improved business mailer comprising in combination:
a front panel;
a back panel secured to said front panel along selected edge regions thereof to define an enclosed pocket therebetween;
an insert disposed in said pocket, said insert having one end free of said panels and its opposite end secured to one of said edge regions of said front and back panels;
a tear strip on said insert having a pair of spaced detachable edges adjacent said opposite secured end of said insert; and
a tear tab portion having a pair of spaced detachable edges on one of said front and back panels adjacent said one edge region, said tear tab portion overlapping said tear strip and secured thereto whereby removal of said tear tab portion from the mailer opens the mailer and removes said tear strip for releasing said opposite secured end of said insert so that said insert is free to be withdrawn from said pocket.

4,586,612
APPARATUS TO PRODUCE SHINGLES

Hans Oberg, Surrey, Canada, assignor to Vanguard Properties Co., Winlock, Wash.

Filed Apr. 16, 1984, Ser. No. 600,897
Int. Cl.[4] B07C *5/00*
U.S. Cl. 209—555 **22 Claims**

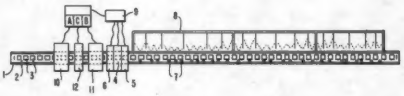


1. Apparatus to move rectangular blanks from a receiving station to a loading station, the apparatus comprising:
a support framework;
a driven track to move the blanks from the receiving station towards the loading station;
a feed station to receive the blanks;
alignment means in the feeding station to position a blank;
means to prevent a blank moving along the feed station while a further blank is in the alignment means;
a separator to separate any blanks which are stacked on top of each other;
a first scanner system to detect blanks of a predetermined width;
a magazine to store blanks detected by the first scanner system;
first transfer means to move blanks detected by the first scanner system from the track to the magazine;
an end stop on the track for stopping the blanks and forming a course;
second transfer means over the track, before the end stop, and dimensioned to receive said course of blanks;
a second scanner system, remote from the end stop, to determine how a pratially formed course of blanks should be completed;
third transfer means to remove a blank from the magazine to the track if the second scanner system indicates a blank of the predetermined width is required to complete the course;
the second scanner system also acting to indicate a full course of blanks beneath the second transfer means; and
means responsive to the second scanner system to move the transfer means to transfer a course of blanks to the loading station.

4,586,613
METHOD AND APPARATUS FOR SORTING FRUITS AND VEGETABLES

Taichi Horii, Shizuoka, Japan, assignor to Kabushiki Kaisha Maki Seisakusho, Hamamatsu, Japan

Filed Jul. 21, 1983, Ser. No. 515,889
Claims priority, application Japan, Jul. 22, 1982, 57-128246
Int. Cl.[4] B07C *5/00, 5/04, 5/28*
U.S. Cl. 209—556 **9 Claims**



1. A method for sorting objects, such as fruits and vegetables, of various shapes, such as spheroid shape, spherical massive shape, non-spherical massive shape and amorphous shape, which method comprises:
conveying the objects to be sorted one by one and positioned in a fixed posture on a tray device of a conveyor, which tray device has a shallow depth, and is freely tiltable sideways;
during transport of the object on the tray device, measuring the weight of the object on the tray device, measuring the planar shape and size from above and measuring the side shape and size and inputting the respective measurement signals into a computing device;
comparing the results of the measurements with respective predetermined values for the weight and shapes and sizes and ranking the objects into one of a plurality of classes of the objects by means of the computing device and producing a discharge signal for each object according to its class;
providing a plurality of discharge operation devices larger than the number of classes of the objects for tilting the tray devices for discharging the objects at intervals along the conveyor, and providing receiving bins along the conveyor corresponding to the classes of the object, the receiving bins for classes expected to have a larger number of objects classified thereinto being larger, and a plurality of discharge operation devices being provided for the larger conveyor bins, and operating the discharge operation devices corresponding to the receiving bin for the class of each object when the object passes such bin for discharging the object into the bin corresponding to the class of the object.

4,586,614

APPARATUS AND METHOD FOR ORGANIZING SUTURE MATERIALS AND MONITORING SUTURE NEEDLES

Ralph Ger, 16 Oaks Hunt Rd., Lake Success, N.Y.

Filed Aug. 22, 1983, Ser. No. 525,309
Int. Cl.⁴ A47F 5/02
U.S. Cl. 211—41 **12 Claims**

1. A suture organizer apparatus for use with sealed packets of surgical needles and sutures, opened packets for said needles and sutures, and used needles, the apparatus formed as a housing comprising three sections separated from each other by walls with at least first and second compartments in each section, the compartments separated from each other by partitions, the first compartments in all sections being mutually aligned, the second and further compartments in all sections being similarly aligned respectively, and each compartment in the first and second sections comprising walls defining a space with an opening for receiving at least one of said packets containing at least one surgical needle and suture, each compartment in said third section comprising walls defining a space with an opening and an absorbent material traversing said space, said material being impalable to cling to a needle impaled therein.

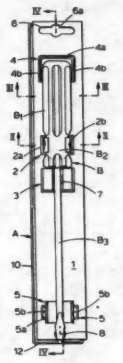
4,586,615

HOLDER

Clive E. O. Quitmann, Hever, Near Edenbridge, England, assignor to Spiralux Limited, Kent, England

Filed Mar. 7, 1984, Ser. No. 587,209
Claims priority, application United Kingdom, Mar. 9, 1983, 8306442
Int. Cl.⁴ A47F 5/08
U.S. Cl. 211—70.6 **15 Claims**

1. A holder for an article, the holder comprising a base plate, holding means for detachably holding the article, first mounting means, and second mounting means, the holding means being on one side of the base plate, the first mounting means being for mounting the holder on a display device, and the second mounting means being for fixing the holder to a support member with the other side of the base plate in contact with said support member, wherein the base plate is generally rectangular in configuration, and wherein the edges of at least one pair of opposed edges of the base plate are provided with complementarily-shaped projections, wherein one of said projection is a flange extending at right-angles to the base plate and away from said one side thereof, the other of said projections being channel-shaped members, whereby the holder can be joined to a similar holder by engaging one of said projections with the complementarily-shaped projection of the other holder.

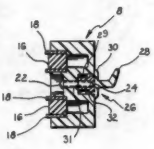


4,586,616

UNIVERSAL MAGNETIC UTENSIL MOUNTING BAR

Rosemary J. Cooper, East Longmeadow; Walter M. Misterka, Wilbraham, and Real L. Mercier, West Springfield, all of Mass., assignors to R. E. Phelon Company Incorporated, East Longmeadow, Mass.

Filed Dec. 9, 1983, Ser. No. 559,974
Int. Cl.⁴ A47F 5/08
U.S. Cl. 211—87 **7 Claims**



1. Wall mountable magnetic fixture for holding tools, utensils and the like comprising an integral molded frame having a pair of vertically spaced, parallel elongated channels opening into one side of the frame, and a third channel opening into the opposite side thereof, a magnetic rod disposed in each of the spaced channels for magnetically attaching the one side of the frame onto a ferrous wall, said third channel being disposed intermediate said spaced channels and being adapted to receive therein a holding fixture having an inner beam portion which corresponds to the cross-section of said magnetic rod whereby the beam portion or another magnetic rod may be selectively fitted into said third channel.

4,586,617

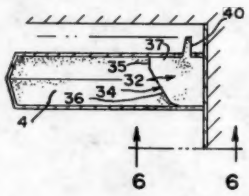
CURTAIN ROD

Jack S. McAllister, Rte. 2, Box 336, Shiloh Rd., Belleville, Ill. 62221

Filed Feb. 21, 1980, Ser. No. 123,115
Int. Cl.⁴ A47H 1/02
U.S. Cl. 211—105.2 **1 Claim**

1. In a return type curtain rod for use with a hanger having a gusset plate and an upwardly projecting finger, said rod having a web and upper and lower flanges projecting in facing relation from opposite long edges of said web and an isolated

hanger finger-receiving hole in the upper of said flanges, the improvement comprising a free end edge on said web beyond said hanger finger-receiving hole extending generally perpendicularly to the upper flange and an edge of said lower flange spaced from the said free end edge of said web in a direction



short of said free end edge and clear of obstruction between said lower flange edge and said free end edge a distance to accommodate said gusset plate, whereby the free edge of said web serves to support said rod against turning moment around said finger.

4,586,618

STORAGE/DISPLAY SYSTEM

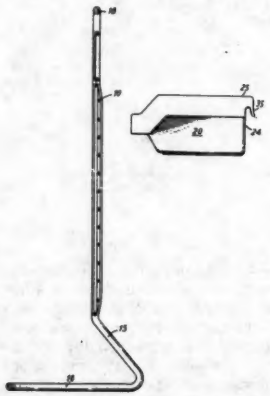
Timothy H. Norman, Swindon, England, assignor to Spafax Holdings, plc, Great Britain

Filed Mar. 28, 1984, Ser. No. 594,228

Claims priority, application United Kingdom, Mar. 29, 1983, 8308688; May 17, 1983, 8313652

Int. Cl.[4] A47F *5/01*

U.S. Cl. 211—133 **4 Claims**



1. A storage/display system having a frame with a plurality of containers supported thereon comprising:

(a) a frame having a pair of spaced vertical side supports, and a pair of spaced horizontal end supports;

(b) a grid of substantially vertical and horizontal wires mounted in said frame between said side supports; and

(c) said plurality of containers having means for supporting said plurality of containers on said grid, the support means comprising a flange spaced from the rear of the container and extending generally parallel to the said rear and forming with the said rear at its lower end an opening to receive a horizontal wire of the grid and having a connector between the container and said flange against which said horizontal wire can abut and which supports said container, said container, said flange and said connector being a unitary structure, and at least two vertically extending slots in said flange and extending into said connector, said slots being located at predetermined spaced intervals to interconnect with and receive the vertical wires of the grid.

4,586,619

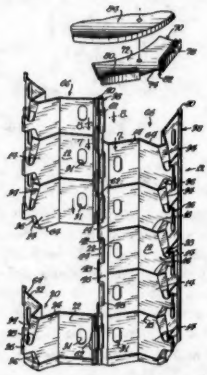
EYEGLASS FRAME DISPLAY

Ronald P. Eckert, Morton Grove, Ill., assignor to Thomas A. Schutz Co., Inc., Morton Grove, Ill.

Filed May 9, 1983, Ser. No. 492,795

Int. Cl.[4] A47B *47/00*

U.S. Cl. 211—189 **15 Claims**



1. A display assembly comprising: a plurality of modules each having a display area for mounting objects;

an elongate male hinge means at a first vertical edge of a wall with a slot on a first module and extending substantially in a first line;

female hinge means at a second vertical edge of a second module, said second vertical edge being linear, said female hinge means being defined at least partially by a tab extending outwardly from said linear second vertical edge and engagable with the male hinge means only by extending the first and second modules relative to each other along said first line,

said first and second modules being pivotable relative to each other about said first line through a first range with the male and female hinge means engaged with each other and the slot and tab aligned along said first line,

said first and second modules being pivotable relative to each other through a second range that is less than the first range with the male and female hinge means engaged with each other and the slot and tab misaligned with each other along the first line,

said male and female hinge means being mated so that the first and second modules can be separated only by moving the first and second modules away from each other in said first line to disengage the male and female hinge means,

a male and female hinge means are provided in spaced relationship on each of said modules and permit joining of each module with any of the other modules so that any number of modules can be joined in succession to increase the overall display area,

said modules are connected continuously with each other to cooperatively define an enclosed space, and

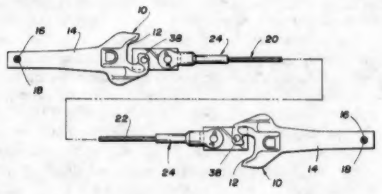
a connector is attached at an upper edge of a plurality of said modules and means interconnect said connectors to rigidify the overall display assembly.

4,586,620

RAILROAD CAR COUPLER ALIGNMENT DEVICE

Russell J. Andrews, 1114 Lange Rd., Birch Run, Mich. 48515

Filed Apr. 23, 1984, Ser. No. 602,803
Int. Cl.[4] B61G 3/14, 7/00
U.S. Cl. 213—15 5 Claims



1. An alignment device for railroad couplers having openings normally provided in their upper surface, comprising;

a central flexible portion;

a pair of end portions connected to said central portion;

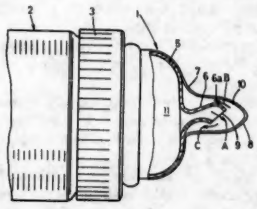
a plate connected to each of said end portions and having an outstanding first stud connected thereto for engagement with a respective one of said openings during a preliminary alignment operation of the couplers.

4,586,621

NIPPLE FOR THE FEEDING OF NURSING INFANTS, OR FOR STIMULATION OF THEIR BUCCAL MOTIONS

José Dahan, Kraainem, Belgium, assignor to Rodam, S.A., Geneva, Switzerland

Continuation of Ser. No. 460,956, Jan. 25, 1983, abandoned. This application Sep. 18, 1985, Ser. No. 778,160
Claims priority, application Switzerland, Feb. 1, 1982, 592/82
Int. Cl.[4] A61J 11/00, 17/00
U.S. Cl. 215—11 R 5 Claims



1. An artificial nipple for infants comprising:

(A) a base portion defining a reservoir chamber; and

(B) a deformable teat portion secured to said base portion and extending axially therefrom and including

(1) an inner relatively thick semi-rigid membrane having a substantially unchanging shape,

(2) an outer relatively thin elastically extensible membrane positioned over said inner semi-rigid membrane and movable relative to inner membrane between an unswelled inactive position in which it closely conforms to said inner membrane and a swollen active position in which it extends axially away from said inner membrane to form an antechamber between said membranes, and

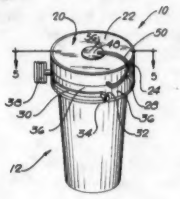
(3) means, including one or more holes in said membranes, operative in response to deformation of said teat portion by a sucking infant to allow liquid to flow from said reservoir chamber and into the space between said membranes to extensibly move said outer membrane from its unswelled inactive position to its swelled axially extended active position to thereby provide a tactile sensory signal to the infant that the teat portion has changed in response to his sucking action.

4,586,622

TAMPER-RESISTANT PHARMACEUTICAL VIAL AND CAP ASSEMBLY

Diann Walldorf, Palatine, Ill., assignor to Affiliated Hospital Products, Inc., St. Louis, Mo.

Filed Jul. 16, 1984, Ser. No. 631,380
Int. Cl.[4] B65D 41/48
U.S. Cl. 215—256 8 Claims



1. In a tamper-resistant pharmaceutical vial and cap assembly comprising an open-top vial for dispensation of a predetermined dosage of a pharmaceutical preparation and a molded cap of resilient material mounted on and covering the top of the vial, the cap having a flat circular portion covering the top of the vial and an integral skirt depending from the flat circular portion and encompassing the upper portion of the vial, the inner surface of the skirt and the outer surface of the upper portion of the vial comprising complementary mating interlock elements precluding manual removal of the cap from the vial, the cap further comprising a tear member defined by at least one weakened junction line such that removal of the tear member from the cap permits ready removal of the cap from the vial; wherein the improvement comprises:

means on the cap assembly for readily communicating that a said tear member on the assembly was previously disengaged from said cap along said weakened junction line, thereby indicating that the vial was previously opened or tampered with, said means for communicating previous tear member disengagement comprising partial circumferential circumscription of said weakened, tear member defining junction line around the cap skirt for an extent thereof sufficiently less than the entire circumference of the cap skirt, such that the tear member remains integrally attached to the cap skirt after separation of the tear member from the cap skirt to the fullest extent permitted by the weakened junction line;

a fill hole located in the flat circular portion of the cap affording access to the interior of the vial for filling thereof with the cap mounted on the vial;

a stopper insertable in the fill hole to close and seal the fill hole after filling of the vial, said fill hole being provided with an annular ridge extending radially outwardly from an uppermost perimeter of the fill hole, said ridge defining an annular flat area recessed below the flat circular portion of the cap and concentrically adjacent to the uppermost perimeter of said fill hole, whereby said fill hole is countersunk in said cap, said stopper having a widened-diameter annular top portion for seating in said annular ridge such that access to the stopper is restricted when the stopper is inserted in the counter-sunk fill hole and;

a starter tab at the beginning of said tear member for initiating disengagement of said tear member and grasping thereof preliminary to full removal of the tear member from the cap skirt, said starter tab comprising a flat, vertically aligned projection located at the beginning terminus of said tear member and projecting perpendicularly outwardly therefrom, said projection having a front and rear surface for grasping of said projection between a thumb and forefinger and whereby pressure of one finger against

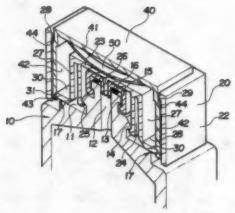
a surface of the tab such that the tab is forced flat against the cap in the direction of said tear member causes said weakened junction lines to break at a point behind or at the base of said tab approximately where said tab joins said tear member.

4,586,623

CONTAINER CAP

Yoshiharu Hatakeyama, Tokyo, and Yosiro Kikuma, Funabashi, both of Japan, assignors to Yoshida Industry Co., Ltd., Tokyo, Japan

Filed Dec. 11, 1984, Ser. No. 680,647
Claims priority, application Japan, Feb. 15, 1984, 59-19085[U]
Int. Cl.[4] B65D *41/28*
U.S. Cl. 215—301 **9 Claims**



1. A container cap adapted to be detachably engaged with a neck portion of a container, comprising:

a cap body forming an external contour portion of the container cap;

a cylindrical wall formed integrally with said cap body substantially at the central portion thereof for engagement with said neck portion;

a push button member fitted within said cap body and being slidable in a vertical direction with respect to said cap body;

a plurality of leg pieces formed integrally with said push button member and extending downwardly therefrom; and

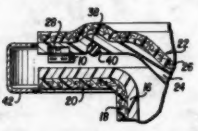
a plurality of lever pieces each, through a hinge means, connected at its one end to each of said leg pieces and at its other end to said cap body, each said lever piece being arranged such that an intermediate portion thereof is abutted at a lower surface thereof against a supporting point of said container whereby each said lever piece is, upon downward movement of said push button member, rotated around said supporting point to thereby push said cap body upward while releasing the engagement between said neck portion and said cylindrical wall.

4,586,624

METHOD AND DEVICE FOR HEAT SEALING THERMOPLASTICS MATERIALS

Mark D. Shaw, Orange Park, Fla., assignor to Bondico, Inc., Jacksonville, Fla.

Filed Aug. 7, 1984, Ser. No. 638,556
Int. Cl.[4] B29C *65/00*
U.S. Cl. 220—67 **13 Claims**



1. A sealable container comprising:

a drum having a thermoplastic wall and an open end;

a lid of thermoplastic material adapted to close the open end of the drum; and

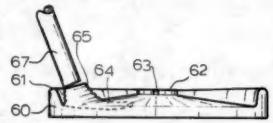
at least a first flat ribbon resistance wire encapsulated in a thermoplastic sheath, said flat wire having a substantially rectangular cross-section with two planar sides of said wire forming the longer sides of said rectangular cross-section and two edges of said wire forming the shorter sides of said rectangular cross-section, said encapsulated wire being interposed between the open end of said drum and said lid and being disposed as an annular ring with the two planar surfaces of the wire in parallel relation to the confronting surfaces of the lid and drum and with one of the two edges of said wire being positioned at a first diameter of said annular ring and the other of the two edges of said wire being positioned at a second diameter of said annular ring greater than the first diameter.

4,586,625

SINGLE USE BEVERAGE CONTAINER TOP

Ernest Garrett, Granada Hills, Calif., assignor to Top Notcher Enterprises, Inc., Granada Hills, Calif.

Filed Jan. 11, 1984, Ser. No. 569,952
Int. Cl.[4] B65D *41/56*
U.S. Cl. 220—266 **2 Claims**



1. A lid for single use beverage containers comprising:

a unitary plastic top of sheet form including an edge rim having a reentrant portion for receiving the lip of a single service beverage container;

said top including a severance line within said edge rim defining an arcuate region having a length extending generally along the inner side of the edge rim and a width extending generally radially;

the length and width of said region defined by said severance line being greater than the width thereof by a factor of at least five;

wherein said top includes a generally upward extending frusto-conical shape formed in said top within the region defined by said severance line and being confined to an area substantially smaller than the area defined by said arcuate region so that a major portion of said arcuate region is outside of said frusto-conical shape;

said frusto-conical shape being of sufficient size to be graspable to remove said region defined by said severance line;

said frusto-conical shape including a second severance line adjacent the extremity thereof dimensioned to enclose a region sufficient to receive a sanitary straw end penetrable thereby.

4,586,626

DEVICE FOR COVERING A RECESS IN A TILED WALL

Albin Prokesch, Goethestrasse 57, A-4020 Linz, Austria

Filed Aug. 12, 1985, Ser. No. 764,537
Claims priority, application Austria, Aug. 28, 1984, 2741/84
Int. Cl.[4] B65D *41/04, 41/34*
U.S. Cl. 220—334 **6 Claims**

1. In a device for closing a polygonal recess in a tiled wall, comprising

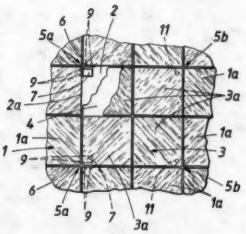
receptacle means, which comprise corner portions and are adapted to be fitted in said recess so that said corner portions extend in a plane, said receptacle means comprising supporting lugs adapted to extend normal to said plane,

a tile cover adapted to assume relative to said receptacle

means a closed position in which said cover extends in said plane, and

pivotal mounting means supported by said lugs and pivotally connecting said cover to said receptacle and permitting said cover to be pivotally moved between said closed position and an open position,

the improvement residing in that



two of said supporting lugs are provided on two adjacent ones of said corner portions,

said pivotal mounting means comprise two hinges, each of which is secured to said receptacle means adjacent to one of said lugs and is secured to said cover, and

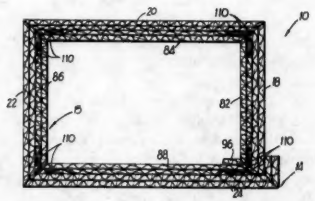
each of said lugs comprises a lanced retaining tongue, which is adapted to be anchored in said wall at a side face of said recess.

4,586,627

REINFORCED BULK MATERIAL CONTAINER

John M. Grigsby, Marietta, Ga., assignor to North American Container Corporation, Mableton, Ga.

Filed Sep. 21, 1984, Ser. No. 652,673
Int. Cl.[4] B65D *5/32, 5/56*
U.S. Cl. 220—443 **3 Claims**



1. A reinforced bulk material container, comprising:

a first wall-forming blank of paperboard scored to provide a series of main panels foldably joined together at a plurality of corners, said first wall-forming blank defining an inside surface and an outside surface;

a second wall-forming blank of paperboard scored to provide a series of main panels foldably joined together at a plurality of corners, said second wall-forming blank defining a front side surface and a back side surface;

a pair of independent support members glued to the backside of said second wall-forming blank at the location of each said corner, said pair of support members each extending substantially the height of said second wallforming blank and arranged so as to straddle and be spaced apart from said corner;

said back side surface of said second wall-forming blank being crushed at the location of each of said support members to accommodate the thickness of the support member and thus provide a continuous surface suitable for laminating to said first wall-forming blank; and

said back side surface of said second wall-forming blank being laminated to said inside surface of said first wall forming blank so as to provide a unitary container having a series of reinforced side walls foldably joined together,

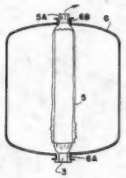
whereby the interior of said container defined by said front side surface of said second wall-forming blank of paperboard provides a plurality of continuous, protrusion-free inner surfaces foldably joined together at angular corners so that said container may be collapsed into a flat condition for shipping and easily erected for filling.

4,586,628

RESILIENT INNER LINER FOR LINING OF TRANSPORT OR STORAGE CONTAINERS

Walter F. Nittel, Raunheim am Main, Fed. Rep. of Germany, assignor to Josef Nittel GmbH & Co KG, Fed. Rep. of Germany

Filed Nov. 2, 1983, Ser. No. 548,007
Int. Cl.[4] B65D *85/00*
U.S. Cl. 220—470 **8 Claims**



1. A liner apparatus comprising,

a resilient liner having two planar films bonded to each other along peripheral edges, said two planar films producing the top and bottom walls of said liner,

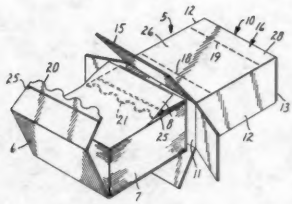
a feed pipe bonded to and extending through said bottom wall at a center portion thereof, the top and bottom walls being folded in an umbrella-like fashion, with the central portions of the top and bottom walls retained adjacent to the other, about an axis that runs in the direction of the feed pipe, the resulting folded liner being inserted into a removable tube-like protective cover.

4,586,629

NOTEPAPER DISPENSER PACKAGE

Harry A. Loder, Mahtomedi, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 595,236, Apr. 2, 1984. This application Jan. 22, 1985, Ser. No. 693,147
Int. Cl.[4] B65H *1/04*
U.S. Cl. 221—46 **8 Claims**



1. A package for dispensing sheets of notepaper which are arranged in the stack and adhered to each other by a narrow band of pressure-sensitive adhesive material positioned at opposite edges of successive sheets within the stack, said package comprising

a box blank consisting essentially of box board having fold

lines defining a band which is wrapped about four sides of the stack of sheets to define flexible flap portions having terminal overlapping ends defining a dispensing opening positioned generally centrally of the stack of sheets parallel to and between said opposite edges, and

a box-like structure comprising a base, sidewalls and a cover supporting said band and a stack of said sheets therein, said cover having means for defining an opening extending between opposed sidewalls of said structure and between said opposite edges for exposing said flap portions and the terminal ends of said band.

4,586,630

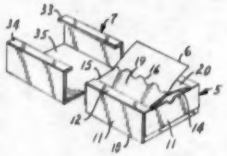
DISPENSING PACKAGE FOR SHEETS

Harry A. Loder, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 2, 1984, Ser. No. 595,236

Int. Cl.[4] B65H *1/04*

U.S. Cl. 221—46 **9 Claims**



1. A package of sheet material comprising

a box-like structure for enclosing a stack of sheet material comprising a base, side walls joined together and interconnecting said base with a cover,

said cover having a pair of slots with said slots extending along opposite marginal edges of the cover and a pair of flaps formed between the slots and defined by generally parallel side edges and opposed mating undulated free edges on each flap wherein the undulations on one of said free edges extend past the undulations of the other free edge between which the sheet material may be dispensed and said free edges affording interference with said sheets to hold a sheet between said edges, said marginal edges being spaced the width of a said stack of sheet material.

4,586,631

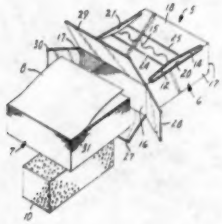
DISPENSING PACKAGE FOR SHEETS

Harry A. Loder, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 595,236, Apr. 2, 1984. This application Jan. 22, 1985, Ser. No. 693,148

Int. Cl.[4] B65H *1/04*

U.S. Cl. 221—58 **6 Claims**



1. A package of sheet material comprising

a box-like structure for enclosing a stack or sheet material with said sheets releasably adhered to each other in the stack along opposite edges of successive sheets, said structure comprising a base, side walls joined together and interconnecting said base with a cover, said cover having an opening extending across said cover and centrally positioned symmetrically through which the sheet material may be dispensed and flap means projecting into said opening and terminating at mating undulated free edges wherein the undulations on one edge extend past the undulations of the other edge affording engagement with the sheets being dispensed between said edges for grasping said sheets, and

a piece of inherently resilient material shaped to be compressed and inserted in the box-like structure on the side of a said stack opposite the cover for urging a said stack of sheets toward said cover and the flap means in the dispensing opening.

4,586,632

PAPER DISPENSER

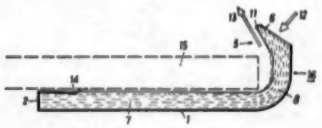
Fritz Kuchler, Klatteweg 4-6, A 9010 Klagenfurt, Austria

Filed Jun. 24, 1983, Ser. No. 507,785

Claims priority, application Austria, Jun. 24, 1982, 2454/82

Int. Cl.[4] B65H *1/04*

U.S. Cl. 221—63 **1 Claim**



1. A paper dispenser for wrapper paper, especially layering strips for foodstuff slices, in the form of a paper-strip dispenser unit disposed below a working surface to facilitates feeding individual strips of paper onto said surface in succession to receive respective multiplicities of overlapping slices, said dispenser unit comprising:

an elongate container receiving a stack of said paper strips and disposed below said surface, said container having a bottom wall extending horizontally below said surface and formed with an upwardly bent portion bent arcuately upwardly at an edge through an angle of substantially 90° thereof to extend above said surface, whereby said stack in the region of the upwardly bent portion of said bottom wall has a fanned out edge disposed above said surface, and

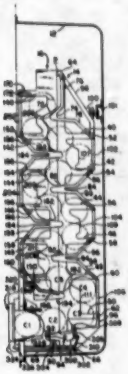
an upwardly and inwardly inclined wall oblique to said portion of said bottom wall along which said edge of said stack is fanned out, said oblique wall extending from an upper end of said portion of said bottom wall toward the interior of said container, said oblique wall being formed with a finger-receiving cutout enabling individual strips of paper to be withdrawn from said stack directly over said surface, said container also comprising a back wall opposite said portion and a pair of side walls, said stack being dimensioned to extend the full length of said container between said oblique wall and said back wall and having a width substantially corresponding to the spacing between said side walls, said back wall being provided with a leaf spring pressing downwardly upon said stack, said oblique wall being provided adjacent said cutout with a pair of downwardly extending lugs engageable at least with an uppermost sheet of said stack for retaining same until said uppermost sheet is withdrawn from said stack.

4,586,633

VENDING MACHINE STORAGE RACK ASSEMBLY

Charlie R. Holland, St. Louis, and Michael J. DelPercio, Fenton, both of Mo., assignors to Coin Acceptors, Inc., St. Louis, Mo.

Filed Apr. 7, 1983, Ser. No. 482,729
Int. Cl.[4] B65G 59/00
U.S. Cl. 221—257 14 Claims



14. A dispensing rack assembly for a container dispensing machine, the rack assembly comprising:

(a) a first molded rack portion including:

1. opposed side portions an outer portion and an inner portion,

2. a plurality of ramp means disposed in spaced vertical relation between said side portions each having a downwardly inclined upper face,

(b) a second molded rack portion including:

1. opposed side portions, an outer portion and an inner portion,

2. a plurality of ramp means disposed in spaced vertical relation between said side portions each having a downwardly inclined upper face,

(c) means connecting said first and second rack portions together being to define at least one container-receiving compartment providing a serpentine path for the containers,

(d) the connected rack portions including a lower ramp means and container engageable cradle means associated with said lower ramp means and rotatable by container load, selectively permitting and precluding forward movement of the containers into the dispensing area,

(e) a face plate disposed forwardly of the lower ramp means including a door opening,

(f) a door hinged to the face plate below the opening said door including a bottom plate and a side plate defining a container-receiving bin, said door being selectively movable between an open position and a closed position, and

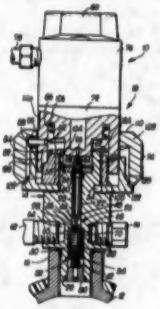
(g) stop means actuated by the door selectively engaging a container on the cradle means while the door is in the open position and permits passage of the container in to the bin when the door is in the closed position.

4,586,634

VALVE ACTUATING LATCHING COUPLER FOR HIGH PRESSURE DEVICE

Mark A. Minter, and William L. Driskell, both of Lee's Summit, Mo., assignors to Puritan-Bennett Corporation, Overland Park, Kans.

Filed Mar. 12, 1984, Ser. No. 588,811
Int. Cl.[4] B67B 7/24; F16L 37/28
U.S. Cl. 222—3 22 Claims



1. Latching and actuator apparatus for attachment to the outlet of a source pressurized fluid, said apparatus comprising:

a body including means for connection thereof to said outlet;

an assembly separate from said body,

one of said body and assembly including an operating element shiftable in a first and a second direction;

latching structure having a portion movable with respect to said body for selectively latching said assembly to, and delatching said assembly from, said body;

selectively openable and closeable valve means; and

means operably coupling said shiftable operating element to said movable portion, and to said vlave means, for latching said assembly to said body as said operating element is shifted in said first direction, and for opening of said valve means only upon further shifting of said element in said first direction subsequent to latching of said assembly to said body, and for closing said valve means upon shifting said element in said second direction and permitting delatching of said assembly from said body only upon further shifting of said element in said second direction and only after said valve means is closed,

said apparatus including structure defining a fluid flow passageway from said outlet to a fluid discharge, for flow of fluid from said source through said passageway and out said discharge, when said assembly is latched to said body and said valve means is open, said valve means being operatively interposed in said passageway.

4,586,635

CONICAL DOME COLLAPSIBLE TUBE DISPENSER FOR DISPENSING LIQUIDS

Virgil H. Collins, Jr., 958 Sunbury Rd., Columbus, Ohio 43219

Filed Jun. 1, 1984, Ser. No. 616,301
Int. Cl.[4] B65D 35/56
U.S. Cl. 222—94 2 Claims

1. A collapsible tube dispenser for liquid such as liquid soap comprising: a collapsible tube container having a conical dome with a conical shaped opening therein; a dispenser apparatus in the cavity of said conical dome for dispensing liquid from said collapsible tube container; said dispensing apparatus further comprising:

a ball and stem having said ball and a portion of said stem protruding from said conical dome opening,

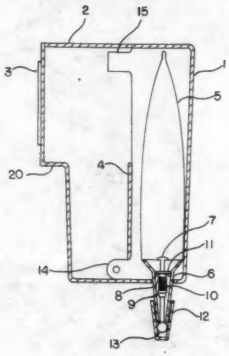
a sealing plug positioned on said stem inside of said cavity and adjacent said opening in said conical dome,

a flow restrictor positioned over the opening in said dispenser, said other end of said stem connected to said flow restrictor,

spring means positioned on said stem between said flow restrictor and said sealing plug for urging said sealing plug to close said opening in said conical dome preventing said liquid from flowing from said collapsible tube container;

said liquid from said collapsible tube container being restrictively dispensed from said conical dome when hand pressure is applied to said ball and stem protruding from said opening in said conical dome, and

wherein said spring pressed sealing plug is moved away from said conical dome opening;



said conical dome preventing air from entering into said collapsible tube container while inverted;

a conical shaped cap member adapted to closely fit over the tip of said control dome;

said internal wall configuration of said cap member complimenting a snap-lock configuration on said conical dome allowing said cap member to snap lock onto said conical dome over said ball and stem; said cap member pressing said ball and stem into said conical dome opening and thereby sealing said liquid inside of said collapsible tube when said cap member is snap-locked onto said conical dome tip.

4,586,636

MOISTURE PROOF CONTAINER FOR MOISTURE CURABLE COMPOSITIONS AND APPARATUS FOR DISPENSING MOISTURE CURABLE COMPOSITIONS FROM A MOISTURE PROOF CONTAINER

Herbert Bauer, Lutry; Hans Waibel, and Joachim Speisebecher, both of Oberursel, all of Fed. Rep. of Germany, assignors to USM Corporation, Flemington, N.J.

Continuation of Ser. No. 521,275, Aug. 8, 1983, abandoned. This application Sep. 11, 1985, Ser. No. 775,938

Claims priority, application United Kingdom, Aug. 27, 1982, 8224679

Int. Cl.[4] B67D *5/62*

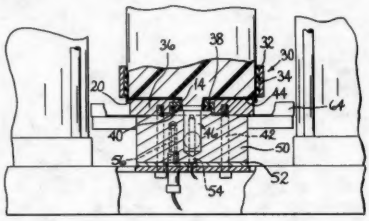
U.S. Cl. 222—146.5 **7 Claims**

1. A package comprising a moisture proof container for containing a solid moisture curable composition which is to be melted and dispensed as a liquid therefrom comprising

a tubular body poriton,

a closure member for closing one end of said tubular body portion, said closure member being sealingly secured to the body portion in such a manner as to leave a narrow annular space around the closure member between the closure member and the tubular body portion, and adapted to be heated to melt solid moisture curable composition adjacent thereto for discharge through an opening in said closure member,

a closure piston at the opposite end of said tubular body portion, said closure piston having a rim projecting towards the closure member and in sliding sealing engagement with an inner wall of the body portion, the rim being received in the annular space between the body portion and the closure member as the piston approaches the closure member so that the container can be substantially completely emptied, and



a moisture curable composition within said container comprising a prepolymer derived from diphenyl methane diisocyanate and a polyester derived from an aliphatic dicarboxylic acid and an aliphatic diol contained within said package.

4,586,637

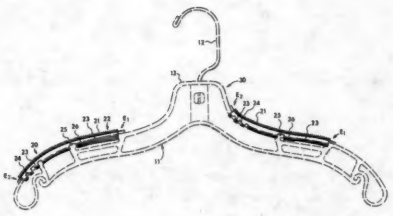
SLIP PREVENTING MEANS FOR GARMENT HANGERS

Seymour Lemel, 9700 Glenfield Ct., #1406, Houston, Tex. 77096

Filed Jun. 22, 1984, Ser. No. 623,316

Int. Cl.[4] A47J *51/094*

U.S. Cl. 223—92 **5 Claims**



1. In a garment hanger and slip preventing means installed upon said hanger, said hanger having a generally I-shaped cross-section, the vertical component of the I-shape being a vertically extending web and the upper and lower horizontal portions of the I-shape defining a pair of flanges which extend along the upper and lower edges of said vertical web, the upper flange of said hanger being adapted to support the shoulder portions of a garment, said upper flange being interrupted and separated to form two pairs of spaced end projections between which the shoulder straps of a garment may be hung, said slip preventing means comprising a generally channel-shaped member of relatively flexible material conforming to the contours of the hanger, said channel-shaped member having an upper surface of uneven contour for creating friction on garments, a yoke-like underside which rests upon the upper flange portion of the hanger, a plurality of inwardly curved fingers formed along both side edges of said yoke, said fingers engaging the side and bottom edges of said upper flange to aid in holding said channel-shaped member in place thereon, wherein the improvement comprises:

(1) a cuff extending from said upper surface, said cuff being:

(a) open on each end for completely encompassing and engaging a projection in the upper flange;

(b) located interior to the ends of the member to such an

extent that each end of the upper surface extending longitudinally from the cuff extends beyond the cuff a distance sufficient for the upper surface of the member to bridge the opening in the upper flange between pairs of spaced end projections;

(c) bound on one side by a first extended lip portion which extends from the cuff toward one end of the member; and

(d) bound on the opposite side by a serration which separates the cuff from a second extended lip portion, and

(2) a second extended lip portion of greater width than any one of the inwardly curved fingers and located between the cuff and the plurality of inwardly curved fingers which are located at the other end of the member.

3. In a garment hanger and slip preventing means installed upon said hanger, said hanger having a generally I-shaped cross-section, the vertical component of the I-shaped being a vertically extending web and the upper and lower horizontal portions of the I-shape defining a pair of flanges which extend along the upper and lower edges of said vertical web, the upper flange of said hanger being adapted to support the shoulder portions of a garment, said upper flange being interrupted and separated to form two pairs of spaced end projections between which the shoulder straps of a garment may be hung, said slip preventing means comprising a generally channel-shaped member of relatively flexible material conforming to the contours of the hanger, said channel-shaped member having an upper surface of uneven contour for creating friction on garments, a yoke-like underside which rests upon the upper flange portion of the hanger, a plurality of inwardly curved fingers formed along both side edges of said yoke, said fingers engaging the side and bottom edges of said upper flange to aid in holding said channel-shaped member in place thereon, wherein the improvement comprises:

(1) a cuff extending from said upper surface, said cuff being:

(a) open on each end for substantially encompassing and engaging a projection in the upper flange, but provided with a slit so that said cuff can be slid over the vertical web to an extent that the upper surface of the member does not cover the opening in order that said opening can receive straps which support garments;

(b) located interior to the ends of the member to such an extent that each end of the upper surface extending longitudinally from the cuff extends beyond the cuff a distance sufficient for the upper surface of the member to bridge the opening in the upper flange between pairs of spaced end projections;

(c) bound on one side by a first extended lip portion which extends from the cuff toward one end of the member; and

(d) bound on the opposite side by a serration which separates the cuff from a second extended lip portion, and

(2) a second extended lip portion of greater width than any one of the inwardly curved fingers and located between the cuff and the plurality of inwardly curved fingers which are located at the other end of the member.

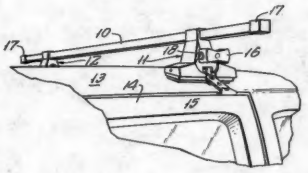
4,586,638

MULTI-PURPOSE RACK FOR REMOVABLE MOUNTING TO AN AUTOMOBILE ROOF OR THE LIKE

Keith L. Prescott, Cambridge, and Robert J. Finnegan, Williston, both of Vt., assignors to The Shelburne Corporation, Shelburne, Vt.

Filed Mar. 6, 1985, Ser. No. 708,951
Int. Cl.[4] B60R *9/00*
U.S. Cl. 224—329 **20 Claims**

1. Roof-mountable rack structure, comprising an elongate bar of uniform external section contour, and at least two like pedestal mounts adapted for roof-stabilized support of longitudinally spaced regions of said bar, which regions are short of the respective outer ends of said bar; each mount comprising a body having a roof-loading base portion and a pedestal-column portion extending upwardly thereof to a bar-supporting end, the bar-supporting end of each mount being characterized by a transverse opening sized and contoured for running-clearance longitudinal reception and through passage of one end of said bar, a one-way-engaging clutch element shiftably carried at the bar-supporting end of said pedestal column portion and normally spring-urged in the direction of engagement to that part of the bar which is embraced by the transverse opening, the direction of one-way-engagement being to lock against bar retraction from and to admit bar-insertion through the transverse opening; said pedestal-column portion having an anchor-



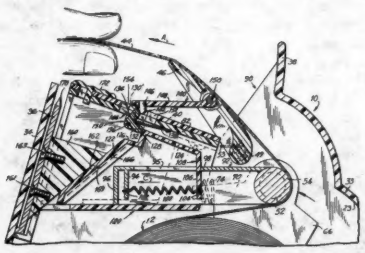
access port near said base portion and open to the side of said mount from which the inserted bar end projects, an anchor strap extending through said port and having means at its outer end for roof-related anchoring reference, a vertically elongate beam movable within said column portion, said beam having an upper-end control connection to said clutch element and a lower-end connection to said strap, and body-referenced transversely acting jack mechanism having an articulated connection to said beam at a location intermediate said upper and lower end connections.

4,586,639

SHEET MATERIAL DISPENSER AND METHOD OF DISPENSING SHEET MATERIAL

Stanley L. Ruff, New Rochelle, N.Y., and Albert Stubbmann, Franklin Lakes, N.J., assignors to Clik-Cut, Inc., New Rochelle, N.Y.

Filed Jul. 20, 1984, Ser. No. 633,019
Int. Cl.[4] B26D *1/02, 5/02;* **B65D** *85/672*
U.S. Cl. 225—1 **33 Claims**



32. A method of dispensing sheet wrapping material, comprising the steps of:

(a) mounting an elongated cutting element having cutting teeth on a housing for movement between a normally guarded position in which the cutting teeth are shielded by the housing, and a cutting position in which the cutting teeth are exposed;

(b) grasping a free end portion of an elongated, limp, non-self-supportable, thin, broad sheet wrapping material mounted in the housing, and pulling out a desired length of the material in a taut condition;

(c) guidably moving the taut material during the pulling-out step initially in a generally forward direction toward the cutting element and past the same to a position spaced

from the cutting element, and subsequently moving the taut withdrawn material in a general direction from the spaced position toward the cutting teeth;

(d) displacing the cutting element from its normally guarded position to its cutting position, including the step of storing energy due to the initial forward movement of the taut material to the spaced position, and the step of releasing the stored energy due to the subsequent movement of the taut material prior to the latter making contact with the cutting teeth.

4,586,640

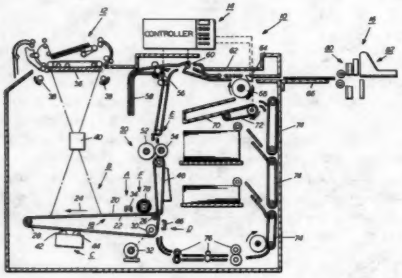
PRINTING MACHINE FINISHING STATION

Charles E. Smith, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 21, 1984, Ser. No. 642,910

Int. Cl.[4] G03G *15/00*; B42B *5/00*; B25C *1/00*

U.S. Cl. 227—14 **11 Claims**



6. A printing system, including:

means for reproducing indicia on successive sheets;

means for advancing at least the sheets having indicia reproduced thereon along a sheet path;

means for receiving the sheets advanced along the sheet path to form a set of sheets;

means for stapling the sheets of the set to one another;

means for adhesively binding the sheets of the set to one another with said stapling means and said binding means being co-linear with one another; and

means for transporting linearly the set of sheets from said receiving means to either said binding means, or said stapling means, or to both said binding means and said stapling means to form the booklet thereof.

4,586,641

APPARATUS FOR ATTACHING PAIRS OF FASTENER ELEMENTS ONTO GARMENT FABRICS

Hiroshi Oura, Kurobe, Japan, assignor to Nippon Notion Kogyo Co., Ltd., Tokyo, Japan

Filed Sep. 11, 1984, Ser. No. 649,320

Claims priority, application Japan, Sep. 19, 1983, 58-144668[U]; Sep. 19, 1983, 58-144669[U]

Int. Cl.[4] A41H *37/04*

U.S. Cl. 227—15 **4 Claims**

1. An apparatus for attaching a pair of fastener elements onto a garment fabric which comprises:

(a) an upper die unit including a vertically reciprocative cylindrical plunger;

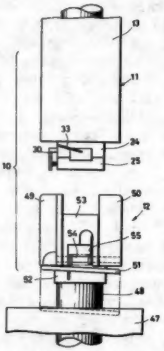
(b) a lower die unit including a stationary anvil;

(c) a punch mounted in and movable relative to said plunger along a vertical path of movement toward and away from said anvil for pressing one of the fastener elements in said upper die unit against the other fastener element in said lower die unit;

(d) an upper block integral with said plunger and provided with a first recess extending across said vertical path of said punch and a second recess extending at a right angle to and in communication with said first recess;

(e) a pair of clamping jaws slidably received in said first recess and normally resiliently urged toward each other for releasably clamping therebetween one of the elements, each of said clamping jaws including an inner end with a peripheral guide groove formed therein for guidedly receiving said one fastener element and a longitudinal recess opening at its one end to said peripheral guide groove;

(f) a manually operative pusher resiliently received in said



second recess and adapted to engage and spread said pair of clamping jaws apart for releasing said one fastener element; and

(g) a lower block secured to said upper block and including a bore coaxially aligned with said cylindrical plunger and a pair of grooves extending across said bore and defining therebetween a ridge for slidably engaging with said longitudinal recess of each of said clamping jaws, said inner end of each said clamping jaws normally projecting into said bore, said ridge being interrupted by said bore and having opposed inner end walls each normally extending into the region of said guide groove of a corresponding one of said clamping jaws.

4,586,642

WIRE BOND MONITORING SYSTEM

John D. Dreibelbis, Chalfont, and I. Marvin Weilerstein, Philadelphia, both of Pa., assignors to Kulicke and Soffa Industries Inc., Horsham, Pa.

Filed May 13, 1985, Ser. No. 733,310

Int. Cl.[4] B23K *20/00*

U.S. Cl. 228—4.5 **11 Claims**

1. A system for monitoring conditions of a fine wire bond interconnection as it is being made between a semiconductor device terminal and a lead out pad, comprising;

an automatic wire bonder of the type having a fine wire to be bonded extending through a wire guide of a bonding tool and the motion of said bonding tool being controlled by a bonding processor,

a reference voltage connection on said semiconductor device to be bonded,

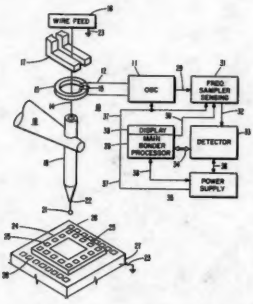
a variable frequency oscillator coupled to said fine wire to be bonded,

said oscillator frequency being varied by the changes in inductive and capacitive reactance in said fine wire as it is bonded to said semiconductor device and then to said lead out pad,

sensing means coupled to said oscillator for providing digital data outputs proportional to said changes in frequency of said variable frequency oscillator,

detector means coupled to said sensing means for processing and storing said digital data outputs from said sensing means,

memory means in said bonding processor for storing a plurality of digital data outputs from said detector means representative of the frequency of said variable frequency oscillator at different times in a bonding operation for each of the fine wire bond interconnections to be made on a semiconductor device,



comparison means in said bonding processor for comparing said digital data outputs from said detector means with the digital data stored in said memory means for determining if the fine wire bond interconnection being made by said automatic wire bonder conforms to the desired frequency digital data representation of good wire bond interconnections, and

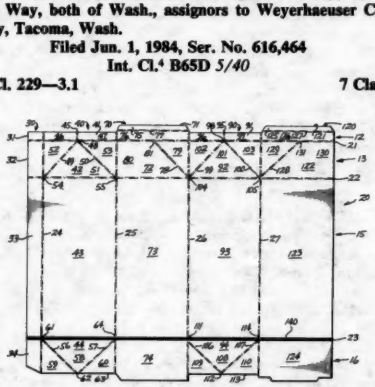
display means coupled to said bonding processor for indicating predetermined deviations from said digital data stored in said memory means representative of good fine wire bond interconnections.

4,586,643

REINFORCED CONTAINER

Donald D. Halabisky, Tacoma, and Dwight A. Dudley, II, Federal Way, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Jun. 1, 1984, Ser. No. 616,464
Int. Cl.[4] B65D *5/40*
U.S. Cl. 229—3.1 **7 Claims**



1. A blank for a liquid container having side panels with score lines on the upper and lower edges of said side panels,

a reinforcing stripe along said lower score line,

said reinforcing stripe comprising essentially

a major portion of polyethylene,

a small amount of vinyl acetate and

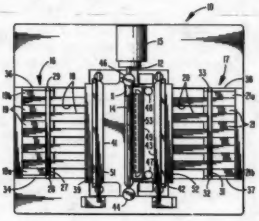
a polypropylene/polyisobutylene copolymer.

4,586,644

DEVICE FOR SHEARING ALIGNING AND WELDING METAL SHEETS

Russell G. Raush, Conestoga; Raymond A. Alleman, Lancaster, and Victor B. Hensel, Lititz, all of Pa., assignors to RCA Corporation, Princeton, N.J.

Filed Aug. 23, 1984, Ser. No. 643,417
Int. Cl.[4] B23K *1/20*
U.S. Cl. 228—5.1 **10 Claims**



1. A device for shearing, welding and aligning two sheets of metal comprising:

first and second shear means spaced a preselected distance apart and arranged to individually shear said sheets to be substantially square;

first movable holding means for receiving one of said sheets, second moveable holding means for receiving the other of said sheets, said first and second holding means being arranged to hold said sheets at shear positions in the proximity of said first and second shear means respectively, said first and second holding means being moveable in opposite directions to move said sheets from said shear positions to a line of weld between said shear means whereby said sheets overlap, said first and second moveable holding means each including a segmented table, some of the segments being fixed and the other segments being moveable, said moveable segments and said fixed segments being elongated in a direction substantially parallel to the direction of travel of said moveable segments, and wherein said first and second holding means includes a clamping bar spanning said segmented table whereby said bars clamp said sheet against said moveable segments during movement to said weld position; and

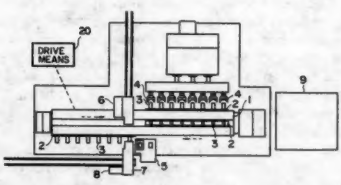
welding means arranged at said line of weld for welding said sheets along said overlap.

4,586,645

WINDING MACHINE FOR COIL BOBBINS

Mamoru Harada, Toda, Japan, assignor to Towa Nittoku Engineering Kabushiki Kaisha, Saitama, Japan

Filed Jan. 26, 1984, Ser. No. 574,292
Claims priority, application Japan, Feb. 7, 1983, 58-17318[U]; Feb. 7, 1983, 58-17319[U]
Int. Cl.[4] B23K *37/00*
U.S. Cl. 228—15.1 **9 Claims**



1. A winding machine for coil bobbins, comprising;

a generally cylindrical index carriage having a carriage axis and drive means for reciprocally moving said carriage in the axial direction and reversibly rotating said carriage about the carriage axis,

a plurality of slide plates supported on the outer periphery of said carriage in equally angularly spaced relationship for reciprocally slidable movement in the axial direction of the carriage,

a plurality of bobbin mount jigs projecting radially outwardly from each of said slide plates in equally axially spaced relationship,

a plurality of wire winding members corresponding in number to the number of the bobbin mount jigs on one of said slide plates,

a common soldering unit to solder the distal ends of wire wound about the bobbin mounted on each of said bobbin mount jigs, to the bobbin,

a common part feed unit to feed bobbins to said bobbin mount jigs, and

a product discharge unit to discharge complete full coil bobbins out of said winding machine.

4,586,646

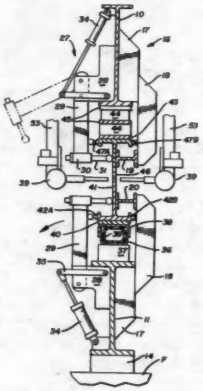
BEAM FABRICATING DEVICE

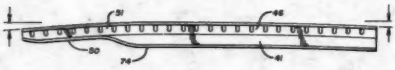
Howard Booher, P.O. Box 277, Randolph, Ohio 44265

Filed Jun. 10, 1985, Ser. No. 742,766

Int. Cl.[4] B23K *37/04*; B23P *11/02, 17/02*

U.S. Cl. 228—44.3 **5 Claims**





1. An I-beam fabrication device used to hold and weld two distinct T-shaped beam portions in a preshaped curved configuration, the beam fabricating device comprises a pair of vertically spaced support members defining a beam receiving area therebetween, a plurality of movable arm assemblies positioned on each of the vertical spaced support members, a plurality of guide rail support brackets secured to each of said vertical spaced support members, guide rails on said support brackets, means for activating said arm assemblies into engagement with a beam portion to clamp said beam portion against said guide rails, means for defining a predetermined curved configuration of said beam portions and means for supporting and bending said beam portions into said predetermined curved configuration, means for maintaining vertical alignment between said guide rails, means for adjustably positioning said beam portions within said receiving area to adapt to a variety of beam portion widths, and welding means movably positioned on one of said vertical support members.

4,586,647

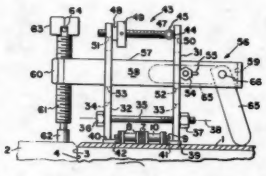
PIPE CLAMPS

Timothy C. Dearman, 3002 S. Main St., P.O. Box 937, Pearland, Tex. 77581

Filed Jul. 15, 1983, Ser. No. 514,105

Int. Cl.[4] B23K *37/04*

U.S. Cl. 228—49.3 **20 Claims**



13. A pipe clamp construction for supporting first and second pipe sections in end-to-end confronting relation, said construction comprising a retainer forming a loop of such size as snugly to encircle one of said pipe sections adjacent one end thereof with a substantial portion of its circumferential length in engagement with said one of said pipe sections; extensions carried by said retainer circumferentially thereof and projecting laterally of said loop, each of said extensions lying between the radially inner and outer edges of said retainer; a plurality of jacks removably coupled to said retainer at intervals spaced circumferentially of said loop, each of said jacks having a pair of legs straddling said retainer and terminating at corresponding ends in grippers confronting one another, each of said grippers being of such height radially of said loop as to be accommodated between the adjacent extensions and the radially outer surface of said one pipe section; operating means for moving said grippers toward and away from one another into and out of clamping engagement with opposite sides of said retainer; a body carried by the legs of each of said jacks and extending axially of said loop a distance to span the joint between said first and second pipe sections; an adjustable force applying member carried by each of said bodies at one end thereof for movements radially of said loop into and out of engagement with said second pipe section; and stabilizing means carried by each of said bodies at the other end thereof for engagement with said first pipe section, any of said jacks being attachable to and removable from said retainer without necessitating adjustment of the diameter of said loop.

4,586,648

PACKING TROUGH AND BLANK THEREFOR

Claes G. Josefsson, Värmdö , and Rolf Andersson, Lund, both of Sweden, assignors to Glace-Bolaget AB and AB Akerlund & Rausing, both of, Sweden

Filed Mar. 13, 1984, Ser. No. 589,171

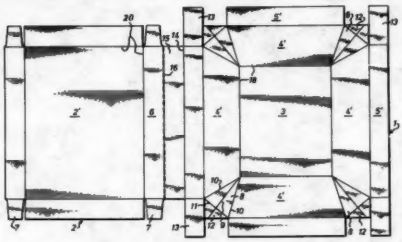
Claims priority, application Sweden, Mar. 17, 1983, 8301463-9

Int. Cl.[4] B65D *5/24*

U.S. Cl. 229—114 **22 Claims**

1. A packing trough made from a blank, comprising a bottom section having a plurality of peripheral edges which define a polygonal shape; a plurality of sidewalls, each sidewall being attached to a corresponding one of said peripheral edges of said bottom section and including a lower wall section extending upwardly and outwardly from said corresponding one of said peripheral edges of said bottom section and an upper wall section extending upwardly from said lower wall section such that said upper wall section is generally perpendicular to said bottom section; and a plurality of corners, each of said corners being defined by a joint formed between a pair of adjacent

sidewalls and including sealing means for sealing said corner, said sealing means including a tab connected between said pair of adjacent sidewalls, said tab including a first portion folded upon itself such that said first portion overlaps one of said lower wall sections of said pair of adjacent sidewalls in such a



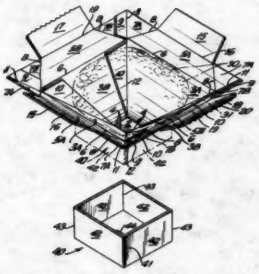
manner that said lower wall sections are in abutting relationship and a second portion folded upon itself such that said second portion overlaps one of said upper wall sections of said pair of adjacent sidewalls in such a manner that said upper wall sections are in abutting relationship.

4,586,649

FOOD PACKAGE

George P. Webinger, Robbinsdale, Minn., assignor to Waldorf Corporation, St. Paul, Minn.

Filed Feb. 13, 1984, Ser. No. 579,682
Int. Cl.[4] B65D *5/22, 5/54*
U.S. Cl. 229—114 **3 Claims**



1. A carton for microwave cooking of food, said carton being formed from a one-piece paperboard blank, and said carton comprising:

(a) a central rectangular panel;

(b) first trapezoidal side wall panels foldably connected to edges of said central rectangular panel with ends of said first trapezoidal side wall panels being foldably connected together, said first trapezoidal side wall panels combining with said central rectangular panel to form a first truncated pyramidal portion of said carton;

(c) a plurality of overlapping closure panels adhesively secured together to form a generally planar rectangular closure for said carton which rectangular closure is parallel to said central rectangular panel;

(d) second trapezoidal side wall panels foldably connected to edges of said rectangular closure with ends of said second trapezoidal side wall panels being foldably connected together, said second trapezoidal side wall panels combining with said rectangular closure to form a second truncated pyramidal portion of said carton;

(e) said first and second truncated pyramidal portions of said carton being foldably joined together along fold lines interconnecting the longer of the parallel edges of each pair of adjacent first and second trapezoidal side wall panels with said fold lines lying in an imaginary plane defining a common base for each of said first and second truncated pyramidal portions of said carton with said imaginary plane being interposed between said central rectangular panel and said planar rectangular closure; and

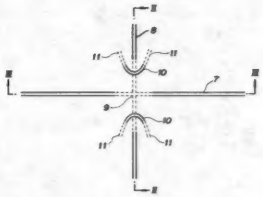
(f) said rectangular closure being substantially larger in area than said central rectangular panel to form a stable base for supporting said carton in storage or on display.

4,586,650

BLANK STRUCTURE WITH INDENTED FOLD LINES FOR A CARDBOARD CONTAINER

Kazuo Sasaki; Yoichi Nishiguchi, and Shinzo Saito, all of Tokyo, Japan, assignors to JuJo Paper Co., Ltd., Tokyo, Japan

Filed Jun. 20, 1985, Ser. No. 746,885
Claims priority, application Japan, Sep. 13, 1984, 59-192227
Int. Cl.[4] B65D *5/40*
U.S. Cl. 229—137 **8 Claims**



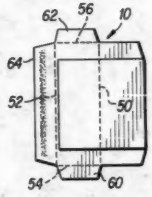
1. A blank structure of flat composite cardboard for a cardboard container, comprising at least four rectangular lateral wall sections, top wall forming sections, bottom wall forming sections and auxiliary sections bordered by specifically designed indented fold lines, the depth of grooves of said indented fold lines being gradually decreased as they approach at least one of a plurality of crossings of said indented fold lines.

4,586,651

MAILING SUB-ASSEMBLY WITH ENVELOPE SHEET AND ENCLOSURE SHEET

William P. Bradley, Hollidaysburg, Pa., assignor to Bedford Engineering Co., Armonk, N.Y.

Division of Ser. No. 568,547, Jan. 5, 1984, Pat. No. 4,530,731.
This application Apr. 18, 1985, Ser. No. 724,438
Int. Cl.[4] B65D *27/00*
U.S. Cl. 229—68 R **1 Claim**



1. A mailing sub-assembly comprising:

an envelope sheet and an enclosure sheet, said enclosure sheet positioned upon said envelope sheet to form a double layer of sheet material wherein one edge of said envelope sheet is in colinear alignment with one edge of said enclosure sheet;

said envelope sheet having four score lines forming a rectangle wherein two of said four separate score lines and said

edge that is in colinear alignment with one edge of said enclosure sheet are parallel; and

said enclosure sheet being free of adhesive material and having no more than one score line, said one score line being in colinear alignment with one of said two parallel envelope sheet score lines; and

wherein one edge of said enclosure sheet lies within said rectangle formed by said score lines of said envelope sheet.

4,586,652

AIR CONDITIONER SYSTEM FOR AUTOMOBILES

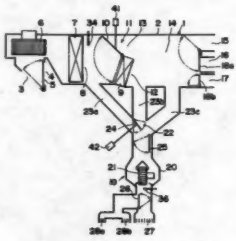
Yoshihiko Sakurai, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed May 17, 1985, Ser. No. 735,204

Claims priority, application Japan, May 21, 1984, 59-101892

Int. Cl.[4] G05D *23/13*

U.S. Cl. 236—13 **7 Claims**



1. An air conditioner system for a vehicle including a passenger compartment having a front-seat part and a rear-seat part, said air conditioner system comprising;

(a) a front-seat air qonditioner unit including a main duct opening at one end thereof to the front-seat part, and means disposed in said main duct for adjusting the amount of heat exchange;

(b) a rear-seat blower unit including a duct opening at one end thereof to the rear-seat part, and an air mix chamber defined in said duct remotely from said one end thereof;

(c) at least two connecting passages connecting said air mix chamber with said main ducts at portions thereof located, respectively, upstream and downstream of said heat exchange amount adjusting means;

(d) at least one air mix door disposed upstream of said air mix chamber and movable for adjusting the proportion of air introduced into said air mix chamber through said connecting passages; and

(e) an electric control unit operatively connected with said air mix door for controlling the position of the latter, said electric control unit including

(1) temperature setting means for presetting the temperature of air to be blown into the rear-seat part,

(2) a sensor for detecting the temperature of air passing through said duct,

(3) computing means for computing a control signal on the basis of the difference between the preset temperature and the detected temperature and

(4) an actuator operatively connected to said air mix door and responsive to said control signal to actuate said air mix door.

4,586,653

DISCHARGE DEVICE FOR A CONDENSATE CONTROLLED BY A BIMETALLIC SNAP DISC

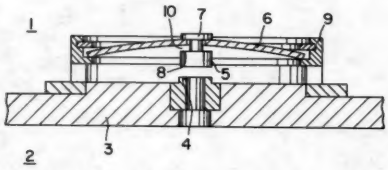
Werner Föller, Stuhr; Josef Lingnau, and Theodor Flessner, both of Bremen, all of Fed. Rep. of Germany, assignors to GESTRA-KSB Vertriebsgesellschaft mbH & Co. Kommanditgesellschaft, Bremen, Fed. Rep. of Germany

Filed Mar. 17, 1983, Ser. No. 476,135

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1982, 3210317

Int. Cl.[4] F16T *1/08*

U.S. Cl. 236—48 R **5 Claims**



1. A steam trap, comprising:

(a) a steam trap housing;

(b) a valve seat mounted in said housing;

(c) a closure part mounted on the supply pressure side of said housing cooperating with said valve seat;

(d) a support on said housing on the supply pressure side thereof;

(e) at least one bimetallic snap disc mounted on said support on the supply pressure side of said housing having an opening snap stroke and a closing snap stroke which overlap in a stroke section, the closing snap stroke of said bimetallic snap disc being directed toward said valve seat as the temperature increases and the force exerted thereby acting in the direction of closing of said closure part; and

(f) an opening cam and a closure stop for said closure part, said bimetallic snap disc engaging said opening cam in the direction of opening of said snap disc and engaging said closure stop in the direction of closing of said snap disc, said opening cam and said closure stop defining therebetween a limited relative stroke of said bimetallic snap disc with respect to said closure part;

said valve seat being disposed so that the closure part closes on said valve seat within said overlapping stroke section;

said closure part closing on said valve seat and the opening snap stroke of said bimetallic snap disc commencing within the limited relative stroke of said bimetallic snap disc with respect to the opening cam and closure stop of said closure part.

4,586,654

ENERGY SAVER DAMPER ASSEMBLY

Stanley Kolt, Mamaroneck, N.Y., assignor to Leonard W. Surloff, Jericho, N.Y., a part interest

Continuation of Ser. No. 505,789, Jun. 20, 1983, Pat. No. 4,520,959. This application Mar. 12, 1985, Ser. No. 710,972

Int. Cl.[4] F24F *13/10*

U.S. Cl. 236—49 **14 Claims**

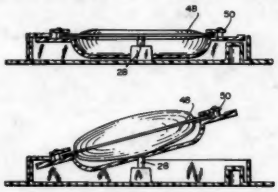
1. An automatic temperature responsive vent for permitting the passage of air from one defined space to another comprising:

(a) frame means for mounting adjacent to an opening from said one defined space to said another defined space, said frame means having a central passage disposed therethrough;

(b) flap means pivotally mounted to said frame means, said flap means being movable from a closed position substantially blocking said passage to an open position permitting

the free flow of air therethrough, said flap means assuming said closed position when at rest; and

(c) temperature responsive drive means being disposed to detect temperature changes adjacent to said opening, said temperature responsive drive means comprising a fluid containing bellows unit capable of expanding and contracting in response to temperature changes between predetermined limits and for generating a force upon



expansion, said fluid containing bellows unit being affixed to said flap means so as to exert a force between and to directly contact a portion of said frame means and a portion of said flap means, said fluid containing bellows unit being activated in response to temperature changes within predetermined limits, said actuation of said fluid containing bellows unit causing the expansion thereof and as a result causing displacement of said portion of said flap means relative to said portion of said frame means.

4,586,655

STEAM TRAP WITH THERMAL CONTROL ELEMENT AND METHOD OF ASSEMBLING SAID TRAP

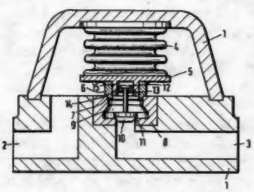
Werner Föller, Stuhr, and Holm Klann, Bremen, both of Fed. Rep. of Germany, assignors to GESTRA Aktiengesellschaft, Bremen, Fed. Rep. of Germany

Filed Dec. 5, 1984, Ser. No. 678,762

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1984, 3402441; Jun. 15, 1984, 3422204; Jun. 15, 1984, 3422198

Int. Cl.[4] F16T *1/02*

U.S. Cl. 236—56 **13 Claims**



1. A method of assembling a steam trap which is comprised of a thermal control element containing an expanding medium arranged on the high pressure side and a shut-off unit closing in the direction of flow, said shut-off unit including two valve seats arranged in the direction of condensate flow, a first closure member associated with the first valve seat in the direction of flow having a through-extending bore with an annular recess therein at the end of said closure member removed from said first valve seat defining a stop in said bore, said first closure member having a peripheral surface including at least two zones of different diameters, a second closure member comprising a pin substantially conforming to the diameter of the second valve seat in the direction of flow and associated therewith, said pin extending through said through-extending bore of said first closure member and having a radially projecting head forming an opening driver received in said annular recess of said bore at the end thereof removed from said second valve seat, said pin having a sealing surface cooperating with said second valve seat, said head of said second closure member cooperating with the stop in said through-extending bore of said first closure member to actuate said second closure member and separated therefrom to form an axial clearance therebetween, and a closure member support having a bottom wall connected to said control element and a lateral wall extending fully around said bottom wall and engaging the zones of the peripheral surface of said first closure member to sealingly support said first closure member, said method comprising the steps of:

inserting said second closure member in the through-extending bore of said first closure member from the end thereof having the annular recess therein; and

plugging said lateral wall of said closure member over the peripheral surface of said first closure member so that said lateral wall of said closure member engages the peripheral surface of said first closure member by plastic deformation.

2. In a steam trap having a thermal control element containing an expanding medium arranged on the high-pressure side, and a shut-off unit closing in the direction of condensate flow, the improvement comprising said shut-off unit including at least two series-connected sealing units sealing in the direction of condensate flow, each sealing unit comprising a valve seat and a closure member associated with said valve seat, said valve seats being formed on a single valve seat body, the first closure member in the direction of flow being coupled with the thermal control element and the second closure member in the direction of flow further including an opening driver actuated by a stop associated with said control element, said opening driver and said stop being separated by an axial clearance so that the movement of said control element is first taken up by said clearance before actuation of said second closure member, said thermal control element including a support means extending up to said valve seat body and having a positioning surface, and said valve seat body having a support surface for the positioning surface of said support means.

4,586,656

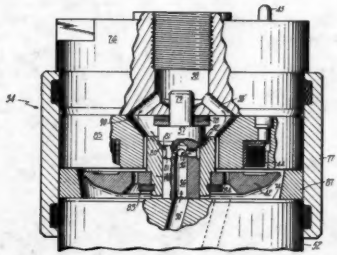
SOLENOID VALVE, PARTICULARLY AS BYPASS VALVE WITH FUEL INJECTOR

Thomas J. Wich, Springfield, Mass., assignor to United Technologies Diesel Systems, Inc., Springfield, Mass.

Filed Aug. 14, 1984, Ser. No. 640,648

Int. Cl.[4] F02M *37/04*; F16K *31/02*

U.S. Cl. 239—88 **12 Claims**



11. A solenoid-valve controlled fuel injector assembly comprising, in combination:

an injector nozzle including a nozzle body, an injector valve in the nozzle body operative between closed and open positions, means biasing said injector valve to said closed position, and a main fuel passage extending in said nozzle body from a first port to said injector valve, said biasing means being overcome and said injector valve being opened when a predetermined fuel pressure threshold in said nozzle fuel passage is exceeded;

said nozzle body including a bypass fuel passage extending from said main fuel passage to a second port; and

a rapidly-responding, normally-open solenoid-controlled

bypass valve assembly including a bypass valve housing integrally connected to said nozzle body and having a drain port, a stationary valve-seat spindle positioned in said bypass valve housing, said valve-seat spindle having a first axial portion of one diameter and a second axial portion of greater diameter than said first portion, an annular control edge of greater diameter than said first portion being formed on said seat spindle second portion, a valve sleeve closely encircling said first portion of said seat spindle in axial sliding relation therewith, said valve sleeve being slidably displaceable between a closed position having a surface thereof in sealing contact with said seat control edge and an open position in which said control edge contacting surface is spaced from said seat control edge axially in the direction of said seat spindle first portion, said valve-seat spindle including a bypass fuel passage therein, said seat spindle bypass fuel passage being in continuous fluid communication with said nozzle body bypass fuel passage via said second port and having a discharge to a plenum region formed between said spindle and said sleeve and radially inward of said control edge, said valve sleeve including a pressure reaction surface radially inward of said valve-sleeve spindle control edge and in continuous communication with said plenum, an armature operatively connected to said valve sleeve, and electromagnetic means responsive to an electrical current for displacing said armature to move said valve sleeve from said open position to said closed position to allow fuel pressure in said main fuel passage to exceed said injector valve threshold, and wherein the pressure of said fuel in said plenum acting axially on said valve sleeve reaction surface rapidly opens said bypass valve when said electrical current terminates and allows flow of said fuel by said bypass valve to said drain port thereby to decrease fuel pressure in said main fuel passage to less than said injector valve threshold.

4,586,657

MALFUNCTION DETECTOR FOR ELECTROSTATIC SPRAYING APPARATUS

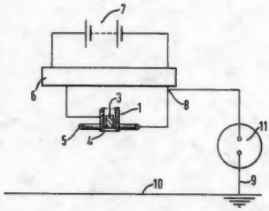
Graham C. Johnson, Surrey, and Timothy J. Noakes, West Sussex, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Oct. 12, 1983, Ser. No. 541,122

Claims priority, application United Kingdom, Nov. 4, 1982, 8231486; Jan. 12, 1983, 8300770

Int. Cl.⁴ B05B *5/02*

U.S. Cl. 239—691 **17 Claims**



1. A spray malfunction detector system for electrostatic spraying apparatus having a sprayhead including a nozzle, and connectable to a high voltage source and for directing a spray of charged particles of fluid towards an earthed target, said system comprising: an earth circuit from the earthed target, the circuit having one or more junctions; a by-pass electrode located in the vicinity of the sprayhead and maintained in use at such an electrical potential as to attract corona discharge from the sprayhead; and a current detector means located in the earth circuit between the earthed target and a junction in the earth circuit and by which corona discharge from the by-pass electrode joins the earth circuit.

4,586,658

IMPACT GRINDING METHOD AND APPARATUS

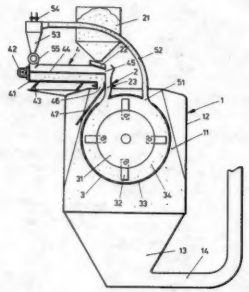
Edwin Eisenegger, Neugasse 19, CH-9242 Oberuzwil, Switzerland

Continuation of Ser. No. 327,080, Dec. 3, 1981, abandoned. This application Oct. 5, 1984, Ser. No. 658,443

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1980, 3046173; Sep. 25, 1981, 3138259

Int. Cl.⁴ B02L *23/08, 23/18*

U.S. Cl. 241—19 **26 Claims**



1. A method for impact grinding granular material to a finished product of a predetermined relatively narrow grain size range and to prevent the formation of excessive undersize material wherein a first sieve means is provided extending substantially entirely over a grinding path between a material feed station and a material receiving post-feed station, and a second sieve means is provided apart from the grinding path, said method comprising the steps of:

introducing material to be ground to said grinding path and impact grinding said material to grain size in said grain size range and passing at least some of said ground material in said grain size range through said first sieve means;

withdrawing at least part of said material not passed through said first sieve means from said grinding path at a predetermined point on said grinding path without allowing any of said withdrawn material to reenter said grinding path;

introducing all of said withdrawn material to the second sieve means for separating oversize material relative to said grain size range from finer material;

conveying said finer material to said post-feed station without passing through said grinding path; and

reintroducing said oversize material to said grinding path to be ground to said grain size range.

4,586,659

SYSTEMITIZED WASTE PRODUCT SEPARATION AND TOTAL UTILIZATION

James M. Easter, II, P.O. Box 23, Owings Mills, Md. 21117

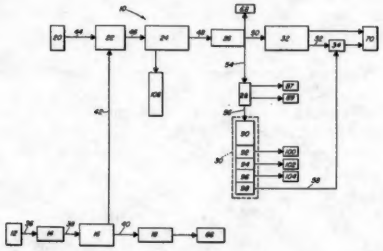
Continuation-in-part of Ser. No. 517,958, Oct. 6, 1983, abandoned, which is a continuation of Ser. No. 251,490, Apr. 6, 1981, abandoned. This application Dec. 4, 1984, Ser. No. 678,099

Int. Cl.⁴ B02C *21/00*

U.S. Cl. 241—24 **24 Claims**

1. A method for systemitizing the mechanical separation and classification of a mass of waste products into the component elements of said mass of waste products without any manual separation or classification of said mass of waste products and then making a total utilization of all of said component elements, comprising: mechanically shredding said waste product components into a plurality of bit pieces and a plurality of chunk-like sizes, then mechanically separating burnable light-

weight particles of said component elements, mechanically incinerating said separated light-weight particles to generate a usable energy means, after mechanically removing said light-weight particles mechanically mixing all of the remaining components of said waste product components with sewage sludge, mechanically automatically composting the mixture of said remaining components of said waste product components and said sewage sludge to remove biodegradable materials and contaminants from recoverable materials, mechanically screening the composted materials to separate fine textured composted material for agriculture use from a mass of heavy



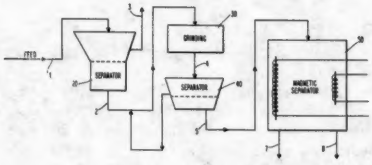
large particles of the now cleaned non-biodegradable materials, mechanically automatically curing said fine textured composted material, mechanically and magnetically removing ferrous type materials from said mass of heavy large particles, and mechanically ballistically separating non-ferrous materials in said mass of heavy large particles into the components thereof, subsequently disposing of said separated ferrous and non-ferrous materials for recycling, and the cured composted material for agricultural uses, the aforementioned sequencing of operations affecting the resulting cleaned non-biodegradable materials and the effected separation and classification of said components of said mass of waste products.

4,586,660

PROCESS FOR SEPARATING ANTHRACITE COAL FROM IMPURITIES

David W. Stiller, and Alfred H. Stiller, both of R.D. #1, Box 126, both of White Haven, Pa. 18661

Filed Apr. 30, 1984, Ser. No. 605,256
Int. Cl.[4] B02C *19/12*
U.S. Cl. 241—24 **3 Claims**



1. A process for separating a first mixture including previously mined anthracite coal, klinker-type cinder ash and other refuse comprising

a. separating said first mixture to produce a refuse portion and a second mixture consisting of anthracite and klinker-type cinder ash,

b. reducing the average particle size in said second mixture to a uniform size,

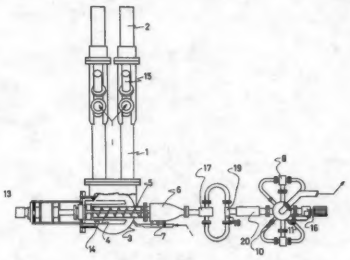
c. subjecting said second mixture to a separating magnetic field to produce a klinker-type cinder ash portion and an anthracite coal portion.

4,586,661

PRESSURE CHAMBER GRINDER EQUIPMENT

Jouko Niemi, SF-33960 Pirkkala, Finland

PCT No. PCT/FI84/00021, § 371 Date Nov. 2, 1984, § 102(e) Date Nov. 2, 1984, PCT Pub. No. WO84/03455, PCT Pub. Date Sep. 13, 1984
PCT Filed Mar. 5, 1984, Ser. No. 674,157
Claims priority, application Finland, Mar. 4, 1983, 830740
Int. Cl.[4] B02C *19/06*
U.S. Cl. 241—34 **5 Claims**



1. Pressure chamber grinder equipment in which finely divided material is ground to ultra-finely divided particles by means of grinding-gas-material jets directed at each other and by using a high starting pressure and temperature, comprising at least one, substantially horizontal plug pipe provided with a feeder funnel, said plug pipe having a free end, a push cylinder operable at the free end of the plug pipe in a longitudinal direction of the plug pipe for compacting material to be ground into a gas-tight plug and for feeding the plug, a pressurized equalizing tank having an upper part connected to said plug pipe, a bottom portion and an outlet pipe, a screw conveyor for breaking up the plug and feeding the material, extending across the bottom portion of said equalizing tank and having an outlet side which is operatively connected in the outlet pipe of said equalizing tank for feeding the material out of said equalizing tank, a pre-grinder connected to the outlet pipe for receiving material therefrom and having substantially tangentially directed grinding-gas nozzles, said pre-grinder having an outlet side, at least one distributor device connected to the outlet side of said pre-grinder for dividing a material-gas flow coming from said pre-grinder into two flows of equivalent magnitude and composition, a grinding chamber having a plurality of grinding nozzles directed substantially conically toward each other so that a collision zone of material-gas jets is formed at a middle of said grinding chamber, each equivalent flow being passed through a grinding chamber grinding nozzle of its own, said grinding chamber having an outlet opening, a classifier connected to the outlet opening of said grinding chamber, the classifier being provided with a first outlet opening for a coarse fraction, which first outlet opening is connected directly to said grinding chamber, and a second outlet opening for a fine fraction, which second outlet opening is connected for discharging ultra-finely divided material as a finished product, said screw conveyor having a shaft, a rotor having radial wings and being connected to said shaft of said screw conveyor, said radial wings surrounding said screw conveyor, a drive motor connected to said shaft for rotating said rotor and for rotating said screw conveyor, and a control system for regulating a running speed of said motor, said control system being arranged to operate on the basis of impulses corresponding to variations in an intermediate pressure prevailing at the outlet side of said pre-grinder when an inlet pressure of grinding gas to the pre-grinder is held constant.

4,586,662

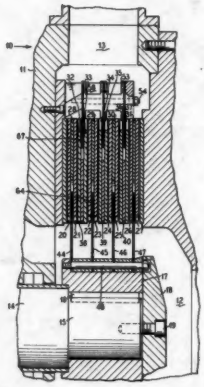
FLEXIBLE SPOKE ROTOR FOR MULTIPLE DISK REFINER

Philip H. Goldenberg, Pittsfield; George J. Neuf, Dalton, and Edward C. Kirchner, Pittsfield, all of Mass., assignors to Beloit Corporation, Beloit, Wis.

Filed Nov. 8, 1984, Ser. No. 669,540

Int. Cl.[4] B02C *19/00*

U.S. Cl. 241—102 15 Claims



1. A subassembly for use in a multi-disk refiner comprising:

a pair of refiner disks in back-to-back relation, each refiner disk having ribs thereon for abrading a stock suspension in contact therewith,

means defining spaced slots between said pair of refiner disks,

a flexible rotor having spokes of lesser dimensions than said slots so as to be freely slidable therein, and

a resilient bumper on each of said spokes frictionally engaging the walls of said slots to provide a pivot for each spoke.

4,586,663

TIP ASSEMBLY FOR ROTARY MINERAL BREAKERS

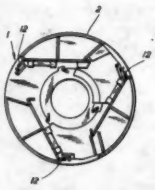
Bryan A. Bartley, Auckland, New Zealand, assignor to Barmac Associates Limited, Wellington, New Zealand

Filed Aug. 4, 1983, Ser. No. 520,160

Claims priority, application New Zealand, Aug. 7, 1982, 201190

Int. Cl.[4] B02L *13/28*

U.S. Cl. 241—197 3 Claims



1. A tip assembly for the rotor of a centrifugal mineral breaker comprising, said rotor being rotated about a substantially vertical axis and having material infeed means oriented in the direction of the vertical axis, radial discharge ports being positioned remotely from the vertical axis, each said port having a trailing edge at which said tip assembly is mounted, said tip assembly further comprising;

a carrier blade extending across the width of the trailing edge of the port, said carrier blade being fitted in place to provide a mounting surface and to form an outer edge over which material from the port will pass in use,

a recess extending in from said outer edge of said carrier blade,

an insert of wear resistant material fixed in said recess,

two replaceable mounting plates mounted on said carrier by mounting means to protect the outer edge of the carrier plate, said mounting plates in their mounted position forming an outer edge adopted to accommodate material passing over from the port,

a recess extending in from an outer edge of each mounting plate,

at least one insert of wear resistent material fixed in each said recess extending in from the outer edge of the mounting plate,

said mounting means for the mounting plate allowing said mounting plates to be fitted in either position on said carrier plate so that after initial wear the position of the mounting plates may be changed to extended the useful life of said mounting plates.

4,586,664

BEARING SUPPORTING SYSTEM FOR CONE CRUSHER

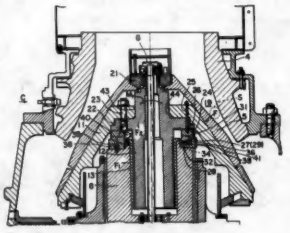
Takeshi Tanaka; Masao Jotatsu, both of Kobe; Masaaki Higaki, Hiroshima; Toshimasa Hamada, Hiroshima; Tadashi Hashikawa, Hiroshima; Toneri Ohashi, Hiroshima, and Seigo Togawa, Hiroshima, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Mar. 29, 1984, Ser. No. 594,730

Claims priority, application Japan, Apr. 1, 1983, 58-49420[U]

Int. Cl.[4] B02C *2/04*

U.S. Cl. 241—213 8 Claims



1. In a cone crusher, a bearing supporting system, comprising:

a head center securely mounted on an upper portion of a main shaft for supporting a mantle;

an eccentric drive shaft for radially supporting said main shaft;

a thrust bearing mounted on an intermediate portion of said main shaft for supporting said main shaft on said eccentric drive shaft; and

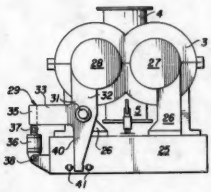
a spherical seat member fixedly mounted on said eccentric drive shaft wherein said thrust bearing further comprises a first member having a first bearing surface and a second member having a second bearing surface on an upper side thereof in abutting engagement with said first bearing surface of said first member and a spherical surface on a lower side thereof in abutting engagement with said spherical seat member for permitting relative deviational movements between said thrust bearing and said spherical seat member.

4,586,665

APPARATUS FOR TREATING CELLULOSE PULP WITH ADJUSTABLE TREATING GAP

Erik F. Eriksson, Ymsenvägen 9, S-121 42 Johanneshov, Sweden

Filed Nov. 27, 1984, Ser. No. 675,211
Claims priority, application Sweden, Nov. 30, 1983, 8306617
Int. Cl.[4] B21C *18/16;* D21B *1/04;* D21D *1/34*
U.S. Cl. 241—259.2 8 Claims



1. Apparatus for treating cellulose pulp having a consistency above the flowage limit, comprising first and second spaced shafts rotatable in the same axial plane, each of said shafts carrying mutually intermeshing means positioned in a housing and cooperating for working said pulp during passage thereof from a housing inlet positioned at one end of the shafts to a housing outlet positioned at an opposite end of the shafts in a working zone located between said ends and said shafts, said apparatus further comprising:

a set of bearings for supporting said first shaft including a first bearing engaging one end of said first shaft and a second bearing engaging the other end of said first shaft;

another set of bearings for supporting said second shaft including a third bearing engaging one end of said second shaft and a fourth bearing engaging the other end of said second shaft;

means positioned upon a mounting support surface for supporting the bearings of one of said sets of bearings including a first support member extending from said first bearing to said support surface and a second support member extending from said second bearing to said support surface;

means positioned upon said mounting support surface for supporting the bearings of the other of said sets of bearings including a third support member extending from said third bearing to said support surface and a fourth support member extending from said fourth bearing to said support surface;

each of the said two support members of at least one of said sets of bearings including a first arm and a second arm, one end of said first arm engaging said bearing and one end of said second arm engaging said support surface;

the bearings of said at least one of said sets of bearings being connected together at their respective first arms by a cross beam;

means connecting said first arms and second arms of said at least one of said sets of bearings for permitting said first arms and second arms to rotate parallel relative to each other to vary the spacing between said shafts to vary the dimensions of said working zone; and,

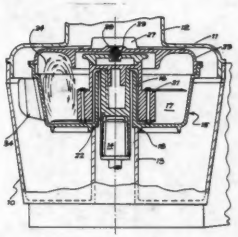
means connected to said beam for rotating said first arms and second arms relative to each other so that both ends of at least one of said shafts are supported for rotating about an axial line in parallel to said shafts to uniformly vary the depth of engagement between said mutually intermeshing means over the whole length of said mutually intermeshing means.

4,586,666

FOOD PROCESSOR

Michael Fox, 45 Murray St., Pyrmont, New South Wales, Australia

Filed Mar. 2, 1984, Ser. No. 585,991
Claims priority, application Australia, Mar. 2, 1983, PF8263
Int. Cl.[4] B02C *18/12*
U.S. Cl. 241—282.2 11 Claims



1. A food processor, comprising a base having an upper surface; electric driving means; a first substantially cylindrical food processing container having an open upper end, an upper part and a bottom with a hole; a first lid which is provided so as to removably close said upper end of said first container; means for removably attaching said first container to said upper surface of said base so that said electric driving means projects through said bottom hole of said first container; a first sleeve provided in said first container so as to surround said bottom hole and project upwardly to form a first annular liquid containing well; a second smaller container located in said upper part of said first container, and having a substantially smaller volumetric capacity than said first container and a base with a hole therein; a second sleeve provided in said second container so as to surround said base hole and project upwardly to form a second annular liquid containing well; a food processing tool provided in said second container so as to process food placed therein; means for drivably connecting said tool to said electric drive means; and a second lid closely fittable on said second container, said first and second lids being formed as separate lids which can be removed from and fitted onto the respective containers independently of one another.

4,586,667

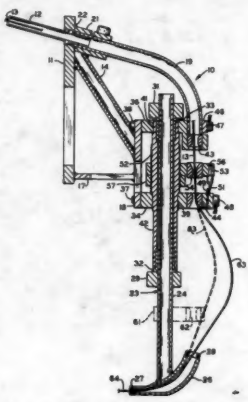
FLYER METHOD

Philip G. Rodenbeck, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Oct. 27, 1980, Ser. No. 200,797
. Int. Cl.[4] H02K *15/04;* H01F *41/12;* B65H *81/06, 59/12*
U.S. Cl. 242—7.03 2 Claims

1. A method of producing dynamoelectric machine winding turns with a flyer rotatable about form means wherein the flyer includes adjustable wire tensioning means; said method including moving a wire discharge means of the flyer in a circular path about the form means while a moving wire segment extends from the discharge means to the form means; and controlling the attitude of the discharge means, with respect to the form means, with the moving wire segment extending therefrom; maintaining tension on the moving wire segment extending from the discharge means to the form means with the tensioning means and also flinging an accumulated moving loop of wire outwardly from the flyer in a region between the tensioning means and the wire discharge means of the flyer; controlling the range of sizes of the accumulated moving loop of wire during a winding operation by preselectively adjusting

the wire tensioning means; and the method further including the step of preselectively controlling the extend of the accumulated moving loop of wire by setting a movable wire guide for the wire in the loop at a preselectable location along the loop.

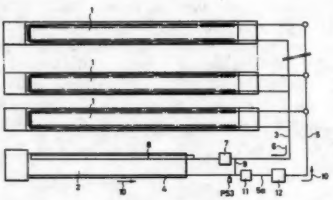


4,586,668

BOBBIN CONVEYING SYSTEM

Shigeki Mori, Inuyama, Japan, assignor to Murata Kikai Kabushiki Kaisha, Japan

Filed Oct. 7, 1983, Ser. No. 540,009
Claims priority, application Japan, Oct. 12, 1982, 57-179269
Int. Cl.⁴ B65H *67/06*
U.S. Cl. 242—35.5 A **9 Claims**



1. A bobbin conveying system of a type having carrier members with bobbins and carrier members without bobbins wherein said system comprises:

spinning frames for forming cops;

a winder for winding yarn from cops;

a closed loop of cop feeding lines and bobbin ejecting lines directly interconnecting said spinning frames and said winder, wherein cops and bobbins which are transported and circulated through said closed loop are fitted on carrier members, wherein carrier members fitted with cops thereon are transported from said spinning frames to said winder and carrier members fitted with bobbins thereon are transported from said winder to said spinning frames; and

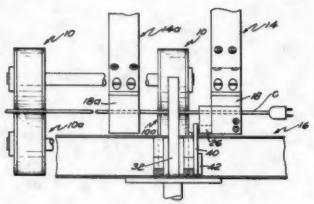
a bobbin supplying device, located downstream from said winder along said bobbin ejecting line, said bobbin supplying device including a discrimination means for sensing whether or not said carrier members which are transported from said winder to said bobbin supplying device have a bobbin thereon and means responsive to said discriminating means for supplying a bobbin to a carrier member which does not have a bobbin thereon.

4,586,669

METHOD AND APPARATUS OF FORMING CORDS OF HANKING

James P. Smith, Cumberland, R.I., assignor to H. F. Hanscom, Providence, R.I.

Filed Sep. 12, 1985, Ser. No. 775,369
Int. Cl.⁴ B65H *54/56, 65/00, 75/28*
U.S. Cl. 242—53 **6 Claims**



3. In a cord hanking machine

means for moving a cord to a first work position;

a pair of spaced cord gripper jaws;

first means gripping the cord in the jaws;

a winding turntable having two upstanding posts;

second means moving the jaws to a post of the turntable;

a latching device located at a post of the turntable;

means associated with the movement of said jaws engaging the latching device to open and close the latching device and grip the cord;

said means returning the jaws to their initial position; and

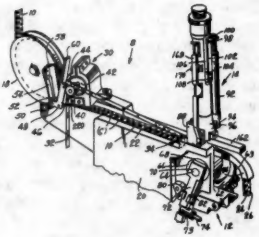
means rotating the turntable to wind the cord about the posts.

4,586,670

TAPE STRIPPER FOR ELECTRICAL COMPONENT TAPE FEEDER

Stanley R. Vancelette, Manchester, N.H.; Waldo B. Hanson, Rowley, and John W. Dacey, Arlington, both of Mass., assignors to USM Corporation, Farmington, Conn.

Filed Dec. 17, 1984, Ser. No. 682,708
Int. Cl.⁴ B65H *75/02*
U.S. Cl. 242—55 **4 Claims**



1. A stripping mechanism for removing the upper strip of an electrical component carrier tape to expose the component in the tape comprising:

a. a housing for supporting and positioning the stripping mechanism;

b. apparatus for removing the upper strip of the carrier tape;

c. upper and lower guide means positioned on said housing adapted to receive the stripped carrier tape there between with the component exposed for removal from the tape,

d. said upper and lower guide means coacting to retain the stripped tape until removed; and,

e. means biasing said lower guide means upwardly and

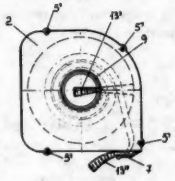
means biasing said upper guide means downwardly to retain the stripped tape and component therein therebetween.

4,586,671

MULTIPLE STRIP DISPENSER

Ivana Piana, and Silvano Piana, both of Genoa, Italy, assignors to Grafoplast s.a.s., Italy

Filed Nov. 14, 1983, Ser. No. 551,044
Claims priority, application Italy, Apr. 1, 1983, 12481 A/83
Int. Cl.[4] B65H *16/06*
U.S. Cl. 242—55.53 **5 Claims**



1. A dispenser comprising a a plurality of box-like holders coupled together for dispensing marking elements wherein each holder comprising a lower part and an upper part, each part having a planar portion with a central hole therein, said lower part and said upper part being connected by means which provides for opening and closing of the two parts, said lower part having a corner provided with an opening protected by a tongue slightly bent outwards, each holder housing a rotatable drum including a core and two circular flanges, a coil of said marking elements wound on said drum, said core extending beyond the flanges and thereby penetrating into the hole in said parts of each holder whereby it can freely rotate, one of said flanges and said core being slotted so that an end of the coil of marking elements is threaded into the slot of the flange and anchored in the slot of the core while the other end protrudes through the opening in the lower part, whereby the user of the dispenser can cut off the required length of marking element, one of said parts having a plurality of bores therethrough about the periphery of said planar portion thereof and the other of said parts having a plurality of matching pins disposed thereon, said pins being operable, when engaged in said bores for locking said parts of a holder together and coupling adjacent holders together.

4,586,672

MACHINE FOR LOADING CASSETTES

James L. King, Orlando, Fla., and George M. Woodley, Shrewsbury, Mass., assignors to King Instrument Corporation, Westboro, Mass., by said George M. Woodley

Continuation of Ser. No. 433,236, Oct. 7, 1982, abandoned. This application Dec. 21, 1984, Ser. No. 684,494
Int. Cl.[4] B65H *19/20*; B31F *5/06*
U.S. Cl. 242—56 R **30 Claims**

1. A machine for loading a use tape into cassettes disposed in a selected loading position comprising:

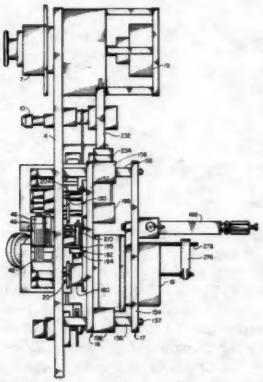
rotatable reel supporting means for holding a supply reel of use tape to be loaded;

a selectively energizable drive motor for driving said reel supporting means in a selected direction of rotation on command;

a cassette-storing magazine for storing cassettes to be loaded with tape, said cassettes each comprising first and second rotatable hubs and a leader tape connected to and extending between said hubs;

a cassette-handling mechanism comprising means for feeding C-Zero cassettes from said magazine to said loading position one at a time, and means for holding a cassette in said loading position while said cassette is being loaded with a use tape and for discharging a cassette from said loading position after the cassette has been loaded with a use tape;

a carriage assembly comprising a carriage, first and second rotatably and parallel spindles carried by said carriage and spaced from one another so as to be engageably simultaneously with the said first and second hubs respectively of a cassette located in said selected loading position, each of said spindles being adapted to interlock with a hub with which it is engaged so as to cause said hub to rotate with it; first selectively energizable motor means carried by said carriage for driving said first spindle in a selected direction of rotation on command, second selectively energizable motor means carried by said carriage for driving said second spindle in a selected direction of rotation on command, means connecting said second motor means and said second spindle so that said second spindle will be driven by said second motor means when said second motor means is energized, a clutch carried by said carriage and coupling said first spindle and said first motor means, said clutch being disengaged when said first motor means is deenergized so that said first spindle may be free-wheeling when said first motor means is deenergized;



means mounting said carriage for movement between a first position in which said spindles are spaced from a cassette disposed in said selected loading position and a second position in which said spindles will engage the hubs of a cassette disposed in said selected loading position; and

means for moving said carriage from one to the other of said first and second position on command.

4,586,673

APPARATUS FOR AUTOMATICALLY MOUNTING A WEB ROLL ON A MILL ROLL STAND

Masateru Tokuno, Nishinomiya; Tetsuya Sawada, Kyoto, and Yoshihiro Ishii, Yao, all of Japan, assignors to Rengo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 431,086, Sep. 30, 1982, abandoned. This application Aug. 21, 1984, Ser. No. 642,719
Claims priority, application Japan, Oct. 5, 1981, 56-159856; Oct. 21, 1981, 56-171057
Int. Cl.[4] B65H *19/12*
U.S. Cl. 242—58.6 **1 Claim**

1. An apparatus for automatically mounting a roll of web material on a mill roll stand having at least one pair of roll supports, said apparatus comprising:

a first driving means for moving said roll supports toward and away from each other;

a second driving means for moving said roll supports in a vertical direction;

a third driving means for moving the web roll in a direction parallel to the axis of said roll supports;

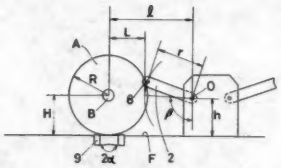
a fourth driving means for moving the web roll in a direction transverse to the axis of said roll supports;

a first pulse generator for generating a signal which is proportional to the amount of rotation of said second driving means;

a second pulse generator for generating a signal which is proportional to the amount of rotation of said third driving means;

a third pulse generator for generating a signal which is proportional to the amount of rotation of said fourth driving means; and

a control means for providing signals to said first, second, third, and fourth driving means so as to control said third



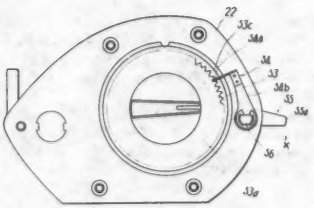
driving means on the basis of a comparison of the signal from said second pulse generator with the width of the web roll, and so as to move the web roll to a position halfway between but sideways of said roll supports, and so as to control said fourth driving means on the basis of a comparison of the signal from said third pulse generator with the diameter of the web roll, and so as to move the web roll to a position midway between said roll supports, and so as to control said second driving means on the basis of a comparison of the signal from said first pulse generator with the diameter of the web roll so as to move said roll supports in a vertical direction, and so that the axis of said roll supports will be in alignment with the center hole in the web roll, and so as to control said first driving means so as to move said roll supports toward each other until they are inserted into a center hole of the web roll, wherein the web roll is supported by said roll supports.

4,586,674

FISHING REEL

Hideki Nakajima, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Mar. 16, 1983, Ser. No. 475,927
Claims priority, application Japan, Mar. 26, 1982, 57-49287
Int. Cl.[4] A01K *89/02*; H02K *49/04*
U.S. Cl. 242—84.52 B **8 Claims**



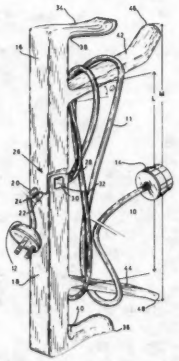
1. A fishing reel comprising: a spool; a reel body rotatably supporting said spool; a drive mechanism supported to said reel body and having a clutch for driving said spool; a magnetic brake for reducing an overrun of said spool; said magnetic brake comprising an electric conductor rotatable together with said spool and a magnet holder having at least one magnet opposite to said conductor, one of said conductor and magnet holder being movable in the direction of the attraction of said magnet to said conductor to a position where a braking effect on said spool is a maximum intensity; an adjuster for moving one of said conductor and magnet relative to the other in the opposite direction of the attraction caused by said magnet so that the braking effect by said magnet is adjusted toward a minimum intensity; and a stopper means for holding said conductor and magnet at an adjusted position relative to one another which is set by said adjuster, said stopper means being provided with a release means which releases the adjusted position held by said stopper means to cause movement of one of said conductor and magnet holder to said position where the braking effect is a maximum intensity.

4,586,675

TANGLE FREE CORD HOLDER

Robert L. Brown, 322 Davis Dr., Kingston, Tenn. 37763

Filed Aug. 16, 1984, Ser. No. 641,265
Int. Cl.[4] B65H *75/40*
U.S. Cl. 242—85.1 **13 Claims**



1. A holder for the winding and storing of flexible cord thereon, such holder permitting the removal of such cord in selected amounts or in its entirety in tangle free condition, which comprises:

an elongated body member having first and further substantially identical body portions each having a first and a further end;

a hinge member joining each of said first ends of said body portions to form said body member;

a clasp at said hinge member to releasably immobilize said hinge member when said body portions are aligned;

means proximate said hinge member for releasably grasping such cord at a midpoint of said body member when said first and further body members are aligned and releasing such cord when said body portions are not aligned;

A first post member having a first end joined to said first body portion at a location removed from said hinge member, and having a further end;

a further post member having a first end joined to said further body member at a location symmetrical and in a common plane with said first post member, and having a further end; and

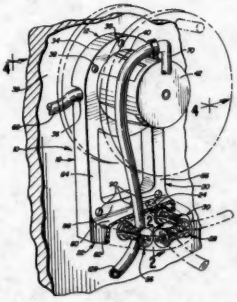
wherein said further ends of said post members are separated a greater distance than said first ends of said post members when said first and further body portions are aligned.

4,586,676

GARDEN HOSE STORAGE APPARATUS HAVING HOSE GUIDE

Damon A. Johnston, Aurora, and George L. Garcia, Naperville, both of Ill., assignors to Suncast Corporation, Batavia, Ill.

Filed May 17, 1984, Ser. No. 611,196
Int. Cl.[4] B65H *75/38*
U.S. Cl. 242—86 **12 Claims**



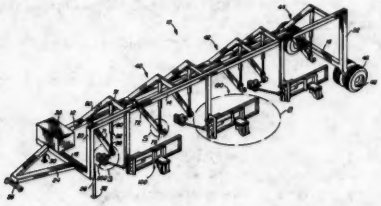
1. A garden hose storage apparatus having a base, a journal supported by the base, and a reel rotatably mounted on the journal for windably receiving a garden hose thereon, the improvement comprising; a shelf secured to the base and being spaced from the reel, said shelf having an aperture for receiving a garden hose windably mountable on the reel, a plurality of rollers rotatably mounted on the shelf and being positioned adjacent to the aperture defining a plurality of contiguous sides of a hose guide, said rollers being rotatably engageable with the hose received in the aperture to facilitate movement of the garden hose through said aperture, a shelf support having one end formed integral with the base and the other end formed integral with the shelf, and said base, said journal, said shelf support, and said shelf being a single molded unitary plastic part.

4,586,677

TAKE-UP DEVICE FOR DRIP IRRIGATION LINES

Enrique F. Nevarez, Star Rte. 1, Box 201, Gila Bend, Ariz. 85337, assignor to Enrique F. Nevarez; Gordon W. Crossman and Billy C. Nall, all of Gila Bend, Ariz.

Filed Oct. 6, 1983, Ser. No. 539,555
Int. Cl.[4] B65H *75/40*
U.S. Cl. 242—86.8 **1 Claim**



1. A device for taking up and paying out tubing of the type used for drip irrigation systems, said device comprising:

(a) a portable frame assembly defining at least one bay having a front;

(b) reel support means associated with said bay, said reel support means including a pair of oppositely disposed arms terminating at cradles adapted to engage and support said reel for rotation and means for raising and lowering said reel support means;

(c) leveling means associated with said bay, said leveling means including guide means reciprocable to guide the application of said tubing on said reel as said reel rotates in relationship to the speed of the reel, said reel leveling means being pivotally connected to said frame and having a first position adjacent the face of said bay and wherein said guide means reciprocates transversely of said bay and being pivotal to a second out-of-the-way position providing access at the front of said bay;

(d) said leveling means further including means for maintaining tension on the section of tubing extending between the reel and the said guide;

(e) reel support spindle shaft means adapted to support said reel for rotation and receivable in said opposed cradles, said spindle shaft means including antifriction bearing means and locking means for selectively engaging said reel for rotation with said shaft, said spindle shaft, bearing means and locking means being detachable from said reel and said cradles; and

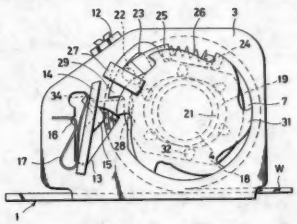
(f) drive means selectively engageable through clutch means with said spindle shaft means, said drive means further including braking means for selectively breaking the rotation of said reel.

4,586,678

AUTOMATIC LOCKING RETRACTOR

Hiroyuki Saito, Chigasaki, and Takeo Ueda, Fujisawa, both of Japan, assignors to NSK-Warner K.K., Japan

Filed Mar. 22, 1985, Ser. No. 715,181
Claims priority, application Japan, Mar. 28, 1984, 59-43273[U]; Jul. 16, 1984, 59-106445[U]
Int. Cl.[4] B60R *22/34*; B65H *75/48*
U.S. Cl. 242—107.4 D **5 Claims**



1. An automatic locking retractor comprising

a casing;

a take-up reel supported on the casing and rotatable about an axis in a webbing winding direction and a webbing releasing direction and biased in the winding direction of a webbing;

an interlocked disc-shaped member defining a plurality of teeth in the circumference thereof and rotatable as a unitary member with the take-up reel, said interlocked disc-shaped member also defining a plurality of first interlocking portions on a side wall thereof;

an interlocking member supported on the casing movably between an engagement position and a non-engagement position in accordance with the diameter of the webbing taken up on the take-up reel, said interlocking member being brought into engagement with any one of the teeth of the interlocked member at the engagement position so as to prohibit the rotation of the take-up reel in the webbing-releasing direction but being kept out of engagement with any of the teeth of the interlocked member at the non-engagement position so as to permit free rotation of the take-up reel;

a control member provided with a plurality of second interlocking portions and supported on the take-up reel;

a first guide means for guiding the control member turnably within a predetermined range which extends between a

non-working position most turned in the webbing-releasing direction and a working position most turned in the webbing-winding direction, both about the axis of the take-up reel;

a second guide means for guiding the control member movably in a direction perpendicular to the axis of the take-up reel between an engagement position where the second interlocking portions engage the first interlocking portions and a non-engagement position where the second interlocking portions are maintained out of engagement with the first interlocking portions, said control member having a working portion capable of engaging the interlocking member at the non-working position to inhibit the movement of the interlocking member to the first engagement position and a non-working portion permitting the movement of the interlocking member to the first engagement position at the working position; and

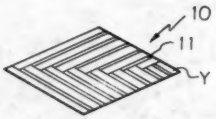
means for allowing at least one of the second interlocking portions of the control member to engage at least one of the first interlocking portions when the diameter of the webbing taken up on the take-up reel decreases and the interlocking member is brought into engagement with the working portion upon release of the webbing, whereby upon subsequent rotation of the take-up reel in the webbing-winding direction, the control member turns in the same direction as the take-up reel and hence moves from the non-working position to the working position.

4,586,679

YARN PACKAGE OF CARBON FILAMENT YARN

Ryuichi Yamamoto, and Hironobu Nojiri, both of Ehime, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Feb. 6, 1984, Ser. No. 577,186
Int. Cl.[4] B65H *54/38*
U.S. Cl. 242—176 **15 Claims**



1. A yarn package comprising a bobbin and a continuous carbon filament yarn wound in layers of helical coils on the bobbin the form of a of square-end cheese in which the yarn is placed with a shifting ratio within a range of from 50% to 150% wherein the shifting ratio is determined by the shifting distance shifted in a longitudinal direction of the package from a yarn position in a layer of winding of the yarn to another yarn position in another layer of winding of the yarn formed after N traverse cycle(s) from the former yarn position, divided by the width of the yarn times 100 and wherein the N is a positive integer, and in which the N is in a range of from 1 to 9.

4,586,680

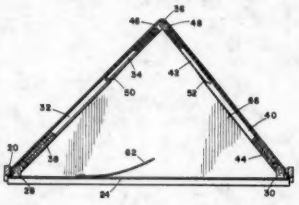
SPRING-ERECTED TELESCOPIC WING SUPPORT STRUCTURE

Anthony DiTommaso, Upland; Ronald T. Inglis, Laguna Beach; Richard C. Worley, Pomona, and Ramon J. Renda, Montclair, all of Calif., assignors to General Dynamics Pomona Division, Pomona, Calif.

Filed Feb. 10, 1982, Ser. No. 347,396
Int. Cl.[4] F42B *13/32*
U.S. Cl. 244—3.27 **20 Claims**

1. An extensible strut assembly for a self-erecting wing, said strut assembly comprising:

a leading strut and a trailing strut, each strut comprising a lower telescoping tubular member that is hollow along substantially its entire length pivotally mounted at the lower end on a fixed hinge pin, and an upper telescoping tubular member that is hollow along substantially its entire length telescopically mounted in said lower tubular member and pivotally connected to a common hinge pin, and,



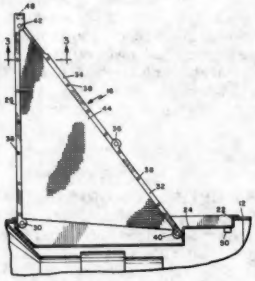
a compression spring disposed within and extending substantially the length of both the lower and upper telescoping strut member of each strut.

4,586,681

SUPERSONIC ERECTABLE FABRIC WINGS

Larry D. Wedertz, Mira Loma; David L. Leslie, Claremont, and John A. Karish, Alta Loma, all of Calif., assignors to General Dynamics Pomona Division, Pomona, Calif.

Filed Jun. 27, 1983, Ser. No. 508,392
Int. Cl.[4] B64C *3/56*
U.S. Cl. 244—49 **22 Claims**



1. A folding erectable wing structure for an airplane and suitable for full erection during supersonic flight, said wing structure comprising:

housing support means defining an elongated slot including an elongated cavity and an opening;

a wing supporting strut assembly mounted in said cavity and comprising;

an elongated leading strut pivotally mounted at an inner end within said cavity, extending substantially the length of said cavity, and extendable from a stowable position closing said opening to an extended wing supporting position of approximately 90° to the stowable position;

an elongated foldable trailing strut assembly of at least two joined foldable strut members pivotally mounted at an inner end within said cavity and at the other end to the outer end of said leading strut for folding to a stowable position and for extending to a wing support position; and

a wing panel formed of a flexible fabric material secured within the boundaries defined by said strut assembly for defining a wing structure; and

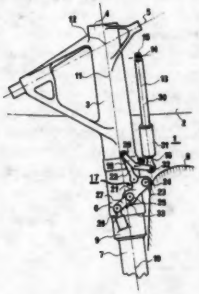
a perforated retaining band encircling said airframe and engaging the outer end of said leading strut for restraining said wing in the stowed position.

4,586,682

LANDING GEAR FOR AN AIRCRAFT STRUCTURE

Jacques Veaux, Chatillon, and Michel Derrien, Versailles, both of France, assignors to Messier-Hispano-Bugatti, Montrouge, France

Filed May 25, 1984, Ser. No. 613,984
Claims priority, application France, May 25, 1983, 83 08571
Int. Cl.[4] B64C 25/10
U.S. Cl. 244—102 R 4 Claims



1. Landing gear for an aircraft structure, said landing gear being of the type which is retractable between an extended position and a retracted position, respectively, and including;

at least one strut having a general strut-defining axis, said strut having one end and another end, with one end of said strut being suitable for being pivotably mounted about at least a first point on said structure, said general strut-defining axis passing substantially through said first point,

a running means supporting low portion carried by the other end of said strut and being suitable for swivelling about a first axis relative to said strut,

a main rod having a first end and a second end, said first end being pivotably mountable on a second point of said structure,

secondary crank means operatively coupling said strut and said low portion and the second end of said rod to swivel the low portion relative to the strut by exerting a force on said crank means via said rod,

said rod including means for subjecting said rod to a variation in length between at least two reference lengths corresponding to a relaxed length and to a compressed length,

said second point being contained in a dihedral angle defined between two planes which meet at a line passing substantially through said first point and containing respectively the lines representing the two positions of said general strut-defining axis when said landing gear is respectively in its extended position and in its retracted position, and

said secondary crank means including a limiting abutment means for preventing any additional swivelling in one direction of said low portion from a determined position thereof relative to the strut.

4,586,683

ROLLING AERIAL REFUELING BOOM

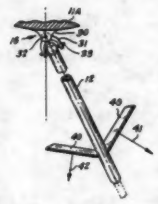
Richard Kerker, Los Angeles, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Continuation of Ser. No. 19,783, Mar. 12, 1979, abandoned, which is a continuation of Ser. No. 870,644, Jan. 19, 1978, abandoned. This application Jun. 21, 1984, Ser. No. 622,914
Int. Cl.[4] B64D 39/00
U.S. Cl. 244—135 A 10 Claims

1. A maneuverable apparatus for interconnecting a high speed supply aircraft with a trailing receiver aircraft in flight, consisting of:

first pivot means mounted to said supply aircraft to provide angular motion about an axis of rotation oriented essentially parallel to the line of flight of said supply aircraft at the time of maneuvering said apparatus;

second pivot means attached to and rotating with said first pivot means to provide angular motion in a generally vertical plane about an axis of rotation perpendicular to the axis of said first pivot means;



a boom, extending generally fore and aft, but disposed at an angle to said axis of said first pivot means and attached to said second pivot means; and

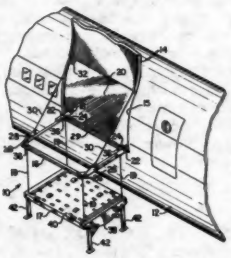
means to affect movement of said boom about said first and second pivot means, whereby lateral displacement of said boom is accomplished by rolling the boom in an arc, the radius of the arc being determined by the displacement of the boom about said second pivot means.

4,586,684

AIRCRAFT LOADING APPARATUS

William Carter, and Gary Carpenter, both of Jamestown, N. Dak., assignors to Western Gear Corporation, Jamestown, N. Dak.

Filed Sep. 1, 1983, Ser. No. 528,488
Int. Cl.[4] B64D 9/00
U.S. Cl. 244—137 R 8 Claims



1. An on-board loader for transporting cargo from ground facilities up to the cargo doorway of an aircraft whereat said cargo is moved into the aircraft, comprising:

an open interior suspension frame having one portion thereof connected to such an aircraft inwardly adjacent such a cargo doorway,

means carried by such an aircraft and connected to a portion of said frame spaced laterally from said one portion for selectively positioning said frame in a stored position within such an aircraft or in a generally horizontal position outwardly of such a doorway,

a cargo carrying platform,

selectively actuable means cooperable with said platform and said frame for supporting said platform for bodily movement with said frame when said frame moves between and into said stored and horizontal positions,

said platform having an upwardly facing surface when said frame is in said horizontal position, and

said actuable means being selectively actutable to lower and raise said platform with respect to said frame when said frame is in said horizontal position, and

said platform having, when said frame is in said horizontal position, a cargo supporting portion defining an uppermost surface selectively movable through the open interior of said frame and located above at least the side of said frame locatable outwardly adjacent such a doorway.

4,586,685

PARACHUTE

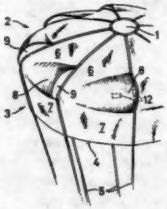
Peter Kostelezky, Reutebühlstrasse 41, D-7987 Weingarten, Fed. Rep. of Germany

Filed Sep. 28, 1983, Ser. No. 536,642

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1982, 3236533

Int. Cl.[4] B64D *17/02*

U.S. Cl. 244—145 **12 Claims**



1. In a rotating parachute having a cap of elongate, radially arranged cloth panels which are sewn together along their longitudinal sides, and a plurality of air exit openings provided in said cap for imparting a rotational torque to said cap, the improvement wherein: at least a majority of the individual panels of cloth are cut asymmetrically such that their side edges have different lengths; said majority of cloth panels are similarly oriented in said cap; the longer longitudinally extending side edge of each of said majority of panels is adjacent a shorter longitudinally extending side edge of the adjacent panel; in partial sections between the ends of their longitudinal extent, the longer longitudinally extending side edges of said majority of panels of cloth are left unsewn; said unsewn sections of said longer longitudinally extending sides of said panels form said air exit openings which are all oriented to provide a torque in the same rotational direction; and said air exit openings are nozzle-shaped with curved edge regions when said cap is inflated.

4,586,686

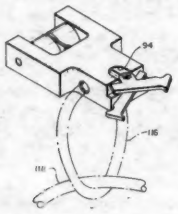
SPRING ACTIVATED CAM ANCHOR

David A. Cason, Box 297 R.R. 4, Kingston, N.Y. 12401

Filed Nov. 13, 1984, Ser. No. 670,989

Int. Cl.[4] B66D *1/54*

U.S. Cl. 248—1 **20 Claims**



1. A chockstone, comprising:

(a) a frame having a forward end portion and a rearward end portion and said forward end portion including a pair of spaced apart legs and each of said legs having substantially planar upper and lower surfaces;

(b) shaft means connected to and extending from each of said legs;

(c) first and second cam means mounted to said shaft means and adapted for rotating in a common direction about said shaft means between an insertion position and a withdrawal position and each of said cam means including an engagement portion extending outwardly beyond said upper surface when in said insertion position and disposed between said surfaces when in said withdrawal position;

(d) means interconnecting said cam means for permitting each of said cam means to independently rotate between said insertion position and said withdrawal position; and,

(e) actuation means associated with said rearward end has a portion thereof operably connected to said interconnecting means for simultaneously rotating said cam means between said insertion position and said withdrawal position.

4,586,687

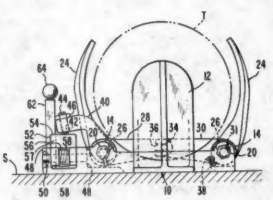
AIR TANK SUPPORT OF THE QUICK RELEASE TYPE

Theodore Ziaylek, Jr., 140 Riverview Dr., Yardley, Pa. 19067

Filed Feb. 25, 1985, Ser. No. 705,282

Int. Cl.[4] A47F *5/00*

U.S. Cl. 248—313 **10 Claims**



1. In an air tank support of the quick-release type having a backplate adapted to support an oxygen tank, a pair of spaced parallel bars mounted thereon for rotation between first and second positions, clamp arms secured to the respective bars to rotate therewith between said positions, the arms in one of said positions being disposed to grip between them an air tank supported upon the backplate and being disposed to release the tank in the other position of the bars, the improvement that comprises:

(a) means for rotating the bars between said positions thereof including

(1) first and second crank means connected to and adapted to rotate the respective bars,

(2) means interengaging the crank means with each other both for joint swinging movement in a first direction effective to rotate the bars to their first positions and in a second, opposite direction in which the bars are rotated in their second position, and

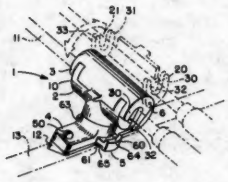
(3) means adapted to be controlled by a user for biasing the crank means in said first and second directions thereof, the respective crank means including crank elements having proximal ends fixedly attached to the respective bars and distal ends overlapping in the space between the bars, said means interengaging the crank means comprising a slidable pivotal connection at the distal ends of said crank elements.

4,586,688

FISHING ROD HOLDER

John E. Hartman; Roger Petrovich, both of Painesville, and Frank Bortnick, Euclid, all of Ohio, assignors to F.J.R. Industries, Inc., Painesville, Ohio

Filed Apr. 20, 1984, Ser. No. 602,350
Int. Cl.[4] A01K *97/10*
U.S. Cl. 248—538 10 Claims



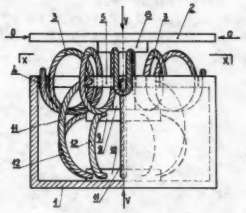
1. Apparatus for supporting a fishing rod, comprising receptacle and cover members pivotably connected to each other and movable about a pivot axis between open and closed positions, the two members when in an open relation being adapted to receive a portion of a fishing rod therebetween, the two members when in a closed relation cooperating to define a housing circumscribing at least part of the contained portion of a fishing rod while supporting the fishing rod in a rest position with the axis thereof generally parallel to such pivot axis, and the two members being cooperative to engage with a part of the fishing rod to resist pivoting movement toward an open position in response to forces in the fishing rod tending to tilt the same on an angle with respect to such pivot axis, and opening means responsive to force applied by such fishing rod to said cover member in a direction generally perpendicular to such pivot axis to open the members to permit removing such fishing rod, mounting means for mounting said receptacle and cover members for use to hold a fishing rod, a tab member protruding from a bottom portion of said receptacle member, said tab portion having an enlarged head and a relatively narrow neck, and slide lock means for selectively sliding between an open position to permit removal of said receptacle and cover members from said mounting means and a locked position to lock said receptacle and cover members in said mounting means, said slide lock means having a pair of openings and a narrow portion therebetween, one of said openings being large enough to pass said enlarged head therethrough and the other being relatively smaller to accommodate said neck but to prevent passage of said head therethrough, said mounting means comprising base means for substantially fixedly mounting of the same on a surface and an opening on the top of said base means to receive therein a portion of said receptacle member securely to hold the same therein, said opening in said base means including a plurality of flat surfaces, and said inserted portion of said receptacle member also including a plurality of flat surfaces for engaging those of said base means, said flat surfaces being cooperative securely to hold said receptacle member and base means in relatively fixed positions with respect to each other, said portion of said receptacle member having a prescribed number of flat surfaces, and said opening in said base means having a relatively reduced number of flat surfaces and a plurality of curved surfaces between at least one pair of said relatively adjacent flat surfaces thereof.

4,586,689

CABLE-BASED AMORTIZATION SUPPORTS WITH INDEPENDENT REACTION TO VERTICAL AND HORIZONTAL STRESSES

Palmiro Lantero, Genoa, Italy, assignor to Officine Meccaniche Liguri de P. Lantero, Genoa, Italy

Filed May 7, 1984, Ser. No. 607,422
Claims priority, application Italy, May 5, 1983, 12511 A/83
Int. Cl.[4] F16F *3/00*
U.S. Cl. 248—570 6 Claims



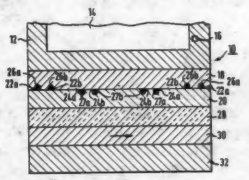
1. A shock absorber, which comprises a first support means disposed horizontally upon which the stress to be absorbed is applied; a second support means having bottom wall means and side wall means defining an open box configuration and located below said first support means; a horizontally disposed first disc member having an aperture therein; a horizontally disposed second disc member below said first disc member; pin means slidably disposed within said aperture and having one end connected to said first support member and the other end connected to said second disc member; a plurality of first semi-circular cable means connecting said second disc member to said bottom wall means and a plurality of second semi-circular cable means connecting said first disc member to said bottom wall means, whereby a vertical force applied to said first support means will be progressively absorbed by said plurality of first semi-circular cable means, and then, when said first support means contacts and is moved as a unit with said first disc member, by said second semi-circular cable means.

4,586,690

APPARATUS FOR THE MANUFACTURE OF MOLDED PARTS FROM MOLDING COMPOUNDS

Volker Härtel, Germering, and Josef Rachel, Wolfratshausen, both of Fed. Rep. of Germany, assignors to Metzeler Kautschuk GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 13, 1984, Ser. No. 630,511
Claims priority, application Fed. Rep. of Germany, Jul. 13, 1983, 3325310
Int. Cl.[4] B22D *27/02*
U.S. Cl. 249—78 4 Claims



1. Device for the manufacture of molded parts from molding materials, comprising a molding tool having a molding cavity formed therein and being divisible, a heating device having two heating plates disposed one on top of the other and fastened to said molding tool, said heating plates being in mutual contact along respective contact surfaces thereof, said contact surfaces having slots formed therein in the form of a plurality

of substantially concentric loops, said slots formed in said contact surface of said heating plate closest to said molding tool being disposed radially outward of said slots formed in said contact surface of said heating plate furthest from said molding tool, and tubular electrical heating elements with metal cladding press-fitted in said slots.

4,586,691

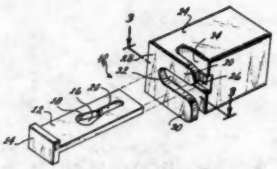
SAFETY SLIDE CLAMP

Gary W. Kozlow, Encinitas, Calif., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed May 13, 1985, Ser. No. 733,667

Int. Cl.[4] F16L *55/14*

U.S. Cl. 251—7 **3 Claims**



1. A safety clamp for use with an I.V. administration device to prevent unwanted free flow through an I.V. tube which comprises:

a blade formed with an aperture for receiving the tube therein, said aperture having an enlarged portion and a tube constricting slot extending therefrom, said blade slidably engagable with the tube for movement between a first position wherein said tube is located in said slot and a second position wherein said tube is located in said enlarged portion;

a base mounted on the device and formed with a well having an opening;

a retaining means comprising a bracket having a pair of substantially parallel fingers extending therefrom to form a slit between said fingers, said retaining means positioned on said base to place said bracket adjacent said opening and superpose said fingers above said opening to form a U-shaped recess between said fingers, said bracket and said base, said recess for receiving the tube therein only when said blade is in said first position and for moving said blade through said slit to locate said blade for insertion into said well and simultaneous movement of said blade into said second position.

4,586,692

FLUSHOMETER VALVE INTEGRABLE WITH A STRUCTURE

James B. Stephens, La Crescenta, Calif., assignor to Coast Foundry & Manufacturing Company, Pomona, Calif.

Filed Nov. 16, 1984, Ser. No. 672,282

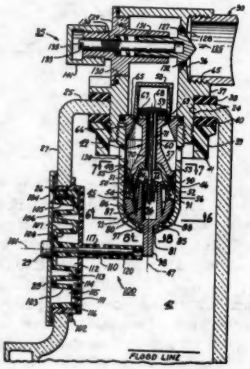
Int. Cl.[4] F16K *21/06*

U.S. Cl. 251—15 **12 Claims**

1. A flush valve system adapted to be mounted to and integrated with a structure having a cavity and walls, there being a pair of openings through said walls into said cavity, said system being adapted to deliver a timed flow of liquid, said system having an inlet adapted to be connected to a source of liquid under pressure, and an outlet adapted to deliver the liquid to a user device, comprising:

a poppet valve mounted at one of said openings having a poppet cylinder with an internal cylindrical wall having a central axis;

a poppet piston slidably fitted in said cylinder; a main poppet seat and a main poppet seal, one of which is carried on the outside of said piston, and the other of which is carried by the cylinder; and a piston seal carried by the piston which is slidingly and fluidsealingly engaged to said wall of the cylinder; a pilot pressure passage extending through the piston from end to end; a pilot seal carried by the piston and in fluid communication with said pilot pressure passage; a tilt plate having a pilot seat adapted to rest upon and seal with said pilot seal unless it is tilted; a pilot shaft fixed to and depending from said tilt plate, passing through said pilot pressure passage with a substantial wall clearance, and projecting into a region in the cylinder below the piston; a rocker seat formed below said poppet piston and within said cylinder; a rocker seated on said rocker seat for rocking movement around a center within said cylinder; restricted drain passage means between said rocker and said rocker seat for permitting limited flow of fluid therethrough to time the seating of the poppet valve; a rocker post depending from said rocker below said rocker seat; an upwardly-directed socket carried by said rocker into which said pilot shaft depends, said socket



having a bounding wall; and a fulcrum collar on said pilot shaft adapted to be engaged with the wall of said socket for lateral deflection; and

actuation means mounted at the other of said openings so comprising a separately-mounted push rod adapted to engage said rocker post to deflect it, rotate the rocker, so the bounding wall of said socket engages said fulcrum collar and laterally tilts the pilot shaft, thereby tilting the tilt plate to open the pilot pressure passage to pressure flow, and thereby to raise the piston to separate the main poppet seal and seat to open the valve to flow, said flow continuing until said pilot shaft is automatically returned to a central position upon the release of said actuation means to permit the tilt plate to cause the pilot seat and seal to engage and liquid thereafter drains from the region under the piston to permit it to return so the main poppet seal and seat again engage and close the valve at a rate determined by the restricted drain passage.

4,586,693

SHUT-OFF APPARATUS

Friedrich Tinner, Haag, Switzerland, assignor to Cetec AG, Sax, Switzerland

Filed Dec. 10, 1984, Ser. No. 680,079

Claims priority, application Switzerland, Dec. 13, 1983, 6648/83

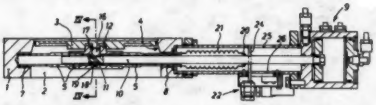
Int. Cl.[4] F16K *31/122, 31/524*

U.S. Cl. 251—56 **14 Claims**

1. In a shut-off apparatus including a main body, a passage extending through said main body, a disk shaped shut-off flap, a seat located in said passage and intended to sealingly cooperate with said shut-off flap, a rocking shaft extending perpendicularly to said passage, which said shut-off flap is mounted to said rocking shaft such to allow a relative movement between

said shaft and said shut-off flap in the longitudinal direction of said rocking shaft but for a positive rotational movement of said shut-off flap and said shaft around the center axis of said shaft; and including an operating means operative to lift said flap off said seat or place said flap onto said seat, respectively, during one phase of movement, and to rotate said flap in its lifted off position and said rocking shaft in a further phase of movement, and including further drive means for driving said operating means,

an improvement comprising a linear drive located within said rocking shaft and forming said driving means, which linear drive comprises:



a linearly reciprocable nonrotatable control rod extending from the outside laterally through said main body and into within said rocking shaft and having a control groove extending at its surface for the determination of said phases of movement,

a follower and driving means which is coupled to said control rod for a control rod initiated movement and engaging said shut-off flap from below and received in said control groove, and

a spring means securing a permanent engagement between said shut-off flap and said follower and driving means and thus maintaining the drive connection between said control groove and said flap.

4,586,694

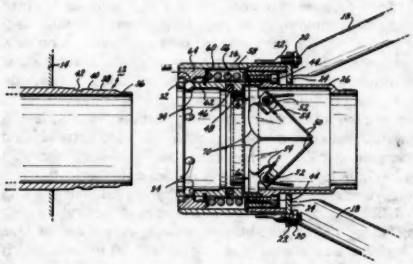
COUPLING ASSEMBLY

Kendall Jones, North Hollywood, Calif., assignor to TA Mfg., Inc., Glendale, Calif.

Filed Jul. 5, 1983, Ser. No. 510,688

Int. Cl.[4] F16K *51/00*

U.S. Cl. 251—149.2 **8 Claims**



1. A coupling assembly for coupling high pressure air flow produced by ground equipment to a start nipple having an interior diameter of a particular dimension contained on an aircraft, including,

a housing member having an enlarged section with an interior diameter of a dimension greater than the particular diameter of the start nipple and with the housing member having one end adapted for coupling to the ground equipment,

an actuating ring located adjacent the other end of the housing,

a pair of vane members forming a clam shell type restrictor valve located within the enlarged section of the housing member and rotating around pivot positions at the sides of the housing member and with the van members in a closed position blocking the high pressure air flow through the coupling assembly and with the vane members in an open position forming a continuation of the interior diameter of the start nipple to form a continuous air flow path through the coupling assembly and start nipple and with each vane member having a shape to include actuating surfaces for receiving actuation force from the actuating ring and with the shape of each vane member providing the actuating surfaces located in front of and a substantial distance from the pivot positions, and

said actuating ring positioned intermediate the vane members and the start nipple when the coupling assembly is coupled to the start nipple and with the end of the start nipple engaging the actuating ring to move the actuating ring into engagement with the actuating surfaces of the vane members to open the vane members, and

a locking assembly coupled to the other end of the housing member and adapted for coupling to and locking on the start nipple.

4,586,695

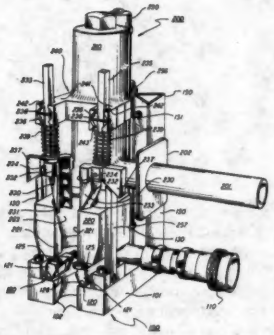
CONTINUOUS TUBE EXTRACTOR

Charlie D. Miller, 6570 Rutger Rd., East Syracuse, N.Y. 13057

Filed Jun. 22, 1984, Ser. No. 623,554

Int. Cl.[4] B66F *1/08*

U.S. Cl. 254—30 **13 Claims**



1. A continuous tube extractor for extracting tubes from a tube sheet comprising

a base member positionable on a tube sheet adjacent to a tube to be extracted therefrom, said base member having an opening formed in a side thereof through which a tube to be extracted is received,

fluid actuated cylinder means carried on said base member and movable relative thereto upon the application of fluid pressure for applying an axial extraction force to a tube,

gripping means carried by said fluid actuated cylinder means for movement therewith and actuable to grip a tube for extraction from a tube sheet,

said gripping means having a side opening formed therein for receiving therethrough a tube to be gripped for extracting from a tube sheet,

control means coupled to said hydraulically actuated cylinder means for actuating the axial movement thereof, and

said fluid actuated cylinder means being operatively connected to said gripping means so that axial movement of said cylinder means will actuate said gripping means to grip a tube to be extracted and apply an axially disposed extraction force thereto,

said gripping means including a pair of jaws coupled to said fluid actuated cylinder for at least limited travel axially and radially with respect thereto, and having generally cylindrical gripping faces for distributing gripping forces

on said tube to be extracted over a substantial cylindrical contact area thereon,

collet means movable with said fluid actuated cylinder means for urging said jaws into engagement with said tube when said cylinder means is moved to an extended position, and

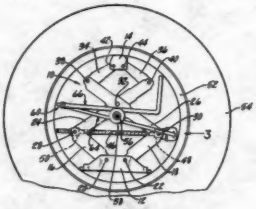
means for positively urging said pair of jaws apart and maintaining the same in an open position to permit insertion of said tube through the opening in the side of the tube extractor when said cylinder is moved to a withdrawn position.

4,586,696

VEHICLE LIFTING JACK WITH INTEGRAL STOWABLE CRANK HANDLE

Lawrence W. Mugford, Mt. Clemens, and John T. Bresnahan, Plymouth, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Oct. 25, 1985, Ser. No. 791,233
Int. Cl.[4] B66F 3/12
U.S. Cl. 254—122 3 Claims



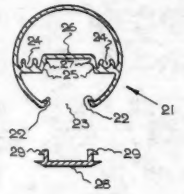
1. In combination with a vehicle lifting jack including an actuating screw, an integral stowable crank, a crank bracket fixedly secured to one end of the actuating screw, the crank bracket having an opening therein, the crank including a generally L-shaped member and a manually engagable crank handle, the L-shaped member comprising a first relatively long arm pivotally connected at one end to the crank handle, the L-shaped member and crank handle being foldable together for storage and unfoldable for cranking the actuating screw to raise and lower the vehicle lifting jack, the L-shaped member having a second relatively short arm extending from the other end of the first arm to define the L-shape, the second arm passing through the opening in the crank bracket and having an enlargement at the terminus thereof, the enlargement preventing withdrawal of the first arm through said opening, projection means on the second arm adjacent to the first arm leaving an unobstructed portion of the second arm between the projection means and enlargement, the crank bracket having slot means extending radially outwardly from the periphery of said opening, the second arm being rotatable to a position where the projection means is in alignment with the slot means and can be passed therethrough, the projection means being passed through the slot means in one direction to move the first arm closer to the crank bracket with the second arm then being rotatable to a cranking position wherein the projection means is out of alignment with the slot means to thereby lock the crank in a cranking position with the first arm being in substantial alignment with the actuating screw, said projection means being passed through the slot means in the other direction with subsequent movement of the second arm along the length of the unobstructed portion thereof to permit the crank to be swung over the lifting jack with the L-shaped member and crank handle being foldable together for storage with the lifting jack.

4,586,697

BALUSTRADE CONSTRUCTION

Isolde Tornya, 207 Edgecliff Road, Edgecliff, N.S.W., 2025, Australia

Division of Ser. No. 416,971, Sep. 13, 1982. This application Nov. 16, 1984, Ser. No. 671,818
Claims priority, application Australia, Sep. 15, 1981, PF0760
Int. Cl.[4] E04H 17/14
U.S. Cl. 256—65 4 Claims



1. A balustrade unit comprising an interchangeable pair of spaced-apart channel-section members each of which is of part-circular cross-section, mouths of said spaced-apart channel-section members, when said balustrade unit is assembled, being directed towards each other, each said channel-section member of said interchangeable pair having a pair of longitudinally-extending, spaced-apart engaging elements constituted by inwardly-facing beads of hook-shaped cross-section formed along the free edges of the said mouths of said channel-section members; a lateral dividing wall extending longitudinally within each said channel-section member, said lateral dividing wall having a central footing portion joined to a pair of flanking portions by outwardly-angled walls so as to form a channel, a mouth of which is directed towards the said mouth of said channel-section member; a plurality of balusters disposable between said interchangeable pair of spaced-apart channel-section members; and a plurality of spacers each one of which is adapted to extend between an adjacent pair of balusters of the balustrade unit so as to close the gap between said adjacent balusters, the free longitudinal edges of each said spacer being formed so as to constitute engaging portions of hook-shaped cross-section adapted to engage with said pair of longitudinally-extending, inwardly-facing beads at the channel-members' mouths; each said baluster comprising a hollow, square-section member having, cut into one side thereof, a pair of transverse slots one adjacent each end of said baluster, said two slots being parallel, and the ends of the said balusters being adapted to abut a said central footing portion of a said lateral dividing wall when said balusters are in position between said interchangeable pair of channel-section members, the said hook-like, inwardly-facing engaging elements engaging with said transverse slots; each said outwardly-angled wall of a said channel being provided with, adjacent said central footing portion, a longitudinally-extending, sharply-ridged deformable bead, between an opposed pair of which a said baluster end is adapted to be firmly wedged.

4,586,698

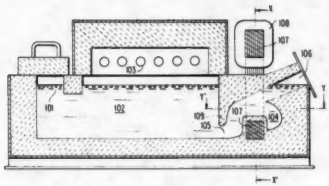
LATERAL BASIN FOR ELECTROMAGNETIC PUMPING IN A FOUNDRY

Henri Carbonnel, 11 avenue Beauséjour, 92160 Anthony, France

Filed Feb. 20, 1985, Ser. No. 703,564
Claims priority, application France, Feb. 20, 1984, 84 02492
Int. Cl.[4] F27D 3/14
U.S. Cl. 266—237 6 Claims

1. In a lateral ceramic basin for a furnace, an electromagnetic pump inserted in the lateral ceramic wall of the lateral ceramic basin, comprising an electrical excitation winding disposed in ambient air for producing a primary current, a vertical magnetic circuit comprising two vertical branches, and a circular duct for molten metal, said duct carrying a secondary current induced therein by the transformer action of said magnetic

circuit, said duct being positioned relative to said two vertical branches such that a horizontal magnetic leakage field H between the two vertical legs in combination with the secondary



current produce a vertically upward force on the molten metal in said duct, wherein at least a part of said magnetic circuit and a portion of said circular duct for molten metal are located in the ceramic wall of said lateral basin.

4,586,699

REFRACTORY PLATE ASSEMBLY FOR USE IN SLIDING CLOSURE UNIT

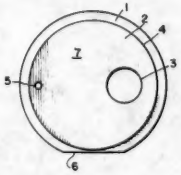
Herbert Bachmann, Lucerne, and Anton Schwyter, Buonas, both of Switzerland, assignors to Stopinc Aktiengesellschaft, Baar, Switzerland

Filed Jul. 31, 1984, Ser. No. 636,247

Claims priority, application Switzerland, Sep. 2, 1983, 4822/83

Int. Cl.[4] B22D *41/08*

U.S. Cl. 266—287 **7 Claims**



1. A refractory plate assembly for use as a stationary refractory plate or as a movable refractory plate in a sliding closure unit, said assembly comprising:

a refractory supporting body;

a refractory disc-shaped member forming a sliding sealing surface of said assembly;

means for removably mounting said disc-shaped member to said supporting body without permanent binding therebetween while preventing said disc-shaped member from working loose from and moving relative to said supporting body, with said refractory supporting body and said refractory disc-shaped member having surfaces in abutting contact without the interposition therebetween of a metallic sheath; and

at least one discharge opening extending through said disc-shaped member and said supporting body.

4,586,700

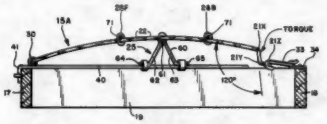
MODULAR SEAT SPRING ASSEMBLY

Lawton H. Crosby, Lake Bluff, Ill., assignor to Morley Furniture Spring Corporation, Lake Bluff, Ill.

Continuation-in-part of Ser. No. 228,583, Jan. 26, 1981, abandoned, which is a continuation-in-part of Ser. No. 83,347, Oct. 10, 1979, abandoned. This application Dec. 2, 1982, Ser. No. 446,314

Int. Cl.[4] A47C *7/28*; F16F *3/02*

U.S. Cl. 267—105 **7 Claims**



1. A seat base assembly for an upholstered furniture seat base, comprising:

(a) a seat frame having front and back rails interconnected by generally parallel side rails;

(b) at least four normally arced sinuous spring bands connected between said front and back rails in generally parallel relationship with said side rails and with each other;

(c) each of said spring bands having torsioning structure adjacent only one of either said front rail or said back rail;

(d) at least two of said spring bands having torsioning structure adjacent only said front rail and at least two of said spring bands having torsioning structure adjacent only said back rail; and

(e) two cross-tie means extending generally parallel to each other and to said front and back rails, and fastened to each of said spring bands at positions spaced substantially the same distance from each other and from said front and back rails.

4,586,701

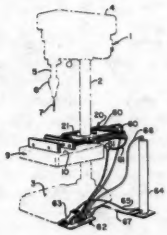
DRILL PRESS VISE ASSEMBLY

Harold W. Oncken, 238 E. First St., Hermann, Mo. 65041

Filed Jul. 26, 1985, Ser. No. 759,302

Int. Cl.[4] B23Q *3/08*

U.S. Cl. 269—25 **7 Claims**



1. A vise assembly for use on a drill press having a vertical cylindrical column, said assembly comprising mounting means slidably and rotatably mounted on and around said column and projecting laterally beyond said column on diametrically opposite sides, said mounting means having journal passages on either side of said column the long axes of which are parallel to one another and substantially perpendicular to said column; a pair of rods slidably journaled in said mounting means passages, said rods projecting from said mounting means in both directions; a second pair of rods extending paralled to said first pair of rods; a fixed vise jaw, one of said pairs of rods being mounted at one end to and against movement relative to said fixed vise jaw; a movable vise jaw, the other of said pairs of

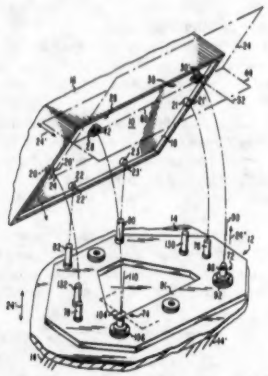
rods being connected at one end to said movable vise jaw; a back plate, both of said pairs of rods being mounted in said back plate; and means carried by said back plate for moving said movable jaw rods with respect to said fixed jaw rods, hence said movable jaw with respect to said fixed jaw, said mounting means supporting said rods and back plate, whereby said jaws can be moved concurrently toward and away from said column and can be rotated, while maintaining their positions relative to one another, about said column.

4,586,702

SYSTEM FOR ORIENTING ONE BODY RELATIVE TO A SECOND BODY IN THREE ORTHOGONAL DIRECTIONS

Robert W. Chambers, Willingboro, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 5, 1985, Ser. No. 762,633
Int. Cl.[4] B23Q *1/06*
U.S. Cl. 269—310 13 Claims



1. A body locating system comprising:

a body having first and second spaced aligned locating openings therein for defining a first body reference plane and at least three spaced first reference surfaces for locating a second body reference plane orthogonal to the first body reference plane; and

body locating means comprising a support including first and second projections adapted to respectively resiliently engage said openings to position the first body reference plane relative to a first support reference plane, and at least three fixed second reference surfaces spaced to respectively abut said first reference surfaces when said projections are engaged with said openings so as to position said second body plane relative to a second support reference plane normal to the first support plane.

4,586,703

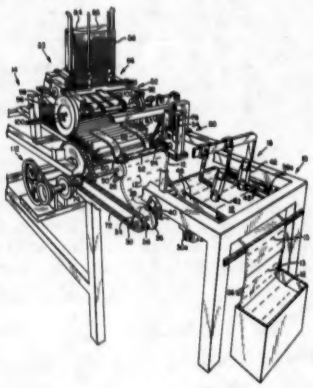
METHOD AND APPARATUS FOR HIGH-SPEED MOUNTING OF DOCUMENTS ON ZIG-ZAG CARRIER

Jan A. McAnelly, West Linn, Oreg., assignor to Block Business Forms, Inc., Portland, Oreg.

Filed Jul. 26, 1984, Ser. No. 634,797
Int. Cl.[4] B41L *1/32*
U.S. Cl. 270—39 15 Claims

1. A method for folding pre-scored or preperforated continuous elongate carrier paper having a plurality of parallel scores or perforations extending across the carrier paper perpendicular to the length thereof comprising:

(a) creating relative movement between a single endless array of spaced-apart members and paper feed means for moving said carrier paper in a direction substantially perpendicular to said scores or perforations, so as to successively present said spaced-apart members to said paper feed means; and



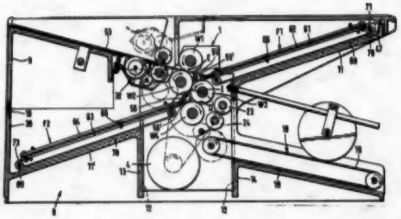
(b) feeding said paper into said array so that said spaced-apart members strike said paper proximately on selected ones of said scores or perforations, causing said paper to fold at said selected scores or perforations.

4,586,704

BUCKLING-TYPE SHEET FOLDER

Werner Lehmann, Gutach; Rainer Fecker, Furtwangen, and Wilhelm Markgraf, Tennenbronn, all of Fed. Rep. of Germany, assignors to Mathias Bäuerle GmbH, Fed. Rep. of Germany

Filed Apr. 3, 1985, Ser. No. 719,228
Claims priority, application Fed. Rep. of Germany, Apr. 4, 1984, 3412569
Int. Cl.[4] B42C *1/00*
U.S. Cl. 270—46 9 Claims



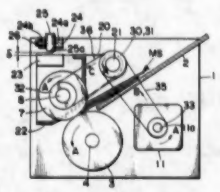
1. A buckling-type folding machine comprising at least two folding cylinders arranged adjacent to each other, at least two folding pockets associated with said folding cylinders, each having a sheet stop rail, a sheet stop movable along said rail and defining a sheet deflector in front of an associated pocket, each stop being adjustable independently of each other to set the folded sizes and folding manner, a draw member secured to each stop, a drive shaft driving said draw member, means defining a fixed reference, a movable scale having at least one scale band associated with each pocket and connected to said drive shaft for movement thereon along with said draw member, said scale being settable in respect to said fixed reference to move said draw member to advance said stop in proportion to the setting of said scale.

4,586,705

AUTOMATIC PAPER FEEDING DEVICE FOR A FACSIMILE EQUIPMENT OR THE LIKE APPARATUS

Jinichi Satoh; Hideya Ino, both of Chigasaki; Masaaki Ishikawa, Hino, and Michihisa Iguchi, Tama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Tokyo, Japan and International Business Machines Corp., Armonk, N.Y.

Continuation of Ser. No. 479,352, Mar. 28, 1983, abandoned. This application Jun. 17, 1985, Ser. No. 744,908
Claims priority, application Japan, Mar. 26, 1982, 57-48715
Int. Cl.[4] B65H *3/52*
U.S. Cl. 271—122 6 Claims



1. An automatic paper feeding device comprising:
a rotational power source;
a first roller located below the lower end of an inclined paper feeding board for drawing papers in the form of a sheet placed on said paper feeding board, said first roller formed of a material having a frictional coefficient defined as U1;
a second roller located above said first roller in line contact with said first roller and forming a nip therebetween, said second roller providing an angular support for said sheets, the leading edges of said sheets assuming an arcuate shape to position the lowermost sheet between said nip, said second roller being rotated more slowly, while in the same direction as said first roller, said second roller formed of a material having a frictional coefficient defined as U2, said first and second rollers being in copperation with each other in drawing the papers one sheet after another through said nip, said sheets having a frictional coefficient defined as U3, and wherein the frictional coefficients are defined by the relationship U1>U2>U3;
a support shaft;
a pair of side plate members pivotally attached at one end to said support shaft, said side plate members rotatably supporting said second roller at the free end thereof;
stopper means for prohibiting said side plate members from being rotated clockwise beyond a predetermined distance; and
a power transmission mechanism including a power source and at least an individual belt wherein rotating power is transmitted from said rotating power source to said second roller at an angle substantially perpendicular to the direction in which contact pressure between the first and second rollers is applied.

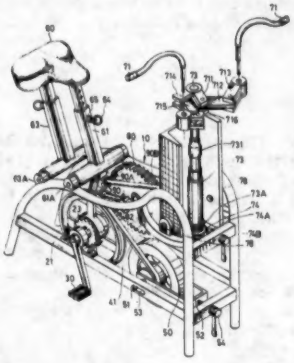
4,586,706

TWO-STAGE EXERCISE BIKE

Yu-Chuan Chen, Taipei, Taiwan, assignor to Wen-Kuei Lee, Taipei, Taiwan

Filed Mar. 13, 1985, Ser. No. 711,142
Int. Cl.[4] A63B *23/04*
U.S. Cl. 272—73 9 Claims

1. A two-stage exercise bike comprising
a bike frame;
a driving means including a driving wheel and in which two ends of a drive wheel shaft are rotatably mounted on said bike frame, and pedals which are rotatably fixed at two ends of said wheel shaft;
a driven wheel rotatably mounted on the bike frame by a driven wheel shaft, and which is driven by said driving means by means of a belt;
an eccentric wheel rotatably mounted on the bike frame by one end of an eccentric wheel shaft;
a clutch means operatively mounted between said driving wheel and said eccentric wheel to selectively connect or disconnect both wheels;
a saddle means pivotally mounted at the rear upper part of said bike frame;
a handle means including a handle bracket, handle bars,
a rotating rod and a wire rope wherein said handle bars are sleeved over the upper portion of said rotating rod, said rotating rod rotatably mounted within said handle bracket, the lower part of said handle bracket being pivotally mounted on the forward part of the bike frame to allow rocking motion, said rotating rod having a screw



guide groove at one end thereof, two ends of said wire rope being fixed to the bike frame and the middle part thereof tightly wrapped around the screw guide groove of said rotating rod;
connecting means connected between said saddle means and handle means; whereby during operation when said clutch means is disengaged, said driving wheel will drive said driven wheel to rotate; and when said clutch means is engaged said driving wheel will further drive said eccentric wheel to rotate, the rotation of said eccentric wheel causing the movement of the connecting means, and causing both said saddle means and said handle means to move in a horizontal reciprocating swing synchronously in the opposite or same direction with respect to each other, said reciprocating swing in turn causing said two handle bars also to move alternately outwardly and inwardly with respect to each other.

4,586,707

COMPETITIVE GAME

David L. McNeight, Regent House, Heaton Lane, Stockport, Cheshire; John G. Lawrence, The Barn, Hollies Lane, Wilmslow, Cheshire, and Pauline Chorlton, 8 Oak Avenue, Newtown, New Mills, Stockport, Cheshire, all of England

Continuation of Ser. No. 427,726, Sep. 29, 1982, abandoned. This application Apr. 29, 1985, Ser. No. 728,148
Claims priority, application United Kingdom, Jan. 2, 1982, 8200013
Int. Cl.[4] A63F *9/00*
U.S. Cl. 273—1 R 5 Claims

1. A method of conducting a game by using a broadcasting arrangement broadcasting to an audience and a telephone network serving members of said audience and said broadcasting arrangement, comprising the steps of:

obtaining a pre-determined telephone number serving said broadcasting arrangement;

broadcasting to said audience a series of questions;

broadcasting to said audience an algorithm for manipulating the collective answers to said series of questions, which algorithm when correctly followed using correct answers to said series of questions will produce as a result said pre-determined telephone number, and which algorithm when not correctly followed using correct answers to said series of questions will not produce as a result said pre-determined telephone number;

broadcasting to said audience an instruction to carry out said algorithm, to treat the result produced thereby as a telephone number, and to call said resulting telephone number;

receiving at least the first call arriving thereafter at said pre-determined telephone number; and

declaring a call arriving at said pre-determined telephone number to be the first place winning call.

4,586,708

SPORTS RACKET STRINGS OF A SYNTHETIC THERMOPLASTIC POLYMERIC MATERIAL

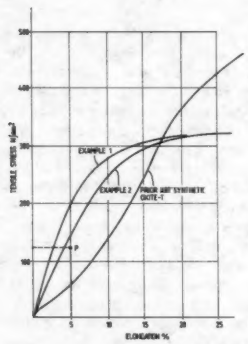
Francis S. Smith; Bruce M. McIntosh, both of North Yorkshire; Nigel W. Hayman, Cheltenham, and Scott Davidson, North Yorkshire, all of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Mar. 5, 1985, Ser. No. 708,816

Claims priority, application United Kingdom, Mar. 9, 1984, 8406219; Feb. 22, 1985, 8504564

Int. Cl.[4] A63B *49/00*; D02G *3/00*

U.S. Cl. 273—73 D **40 Claims**



2. A multifilament sports racket string comprising: a plurality of polyetheretherketone monofilaments, said string having an elongation not exceeding 5% when a tensile stress of 100 Newtons/mm^2 is applied along the axis of the string and a dynamic stiffness, measured at a frequency in the range 150 to 300 Hz at a mean tensile stress of 175 Newtons/mm^2 of not greater than 1.150 times the dynamic stiffness measured at a mean tensile stress of 80 Newtons/mm^2.

12. A sports racket strung with a string comprising at least one thermoplastic aromatic polyetheretherketone monofilament, said string having an elongation not exceeding 5% when a tensile stress of 100 Newtons/mm^2 is applied along the axis of the string and a dynamic stiffness, measured at a frequency in the range 150 to 300 Hz at a mean tensile stress of 175 Newtons/mm^2 of not greater than 1.150 times the dynamic stiffness measured at a mean tensile stress of 80 Newtons/mm^2.

4,586,709

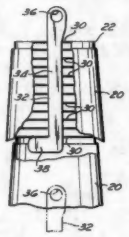
CUP STACKING GAME APPARATUS

Wayne P. Godinet, 1717 Kraft St., Oceanside, Calif. 92054

Filed Aug. 23, 1984, Ser. No. 643,454

Int. Cl.[4] A63B *71/02*

U.S. Cl. 273—86 R **7 Claims**



6. Game apparatus adapted for transportation thereof, comprising:

(a) at least six identical inverted cups nested in upright series one inside another,

(b) said cups having aligned bottom central openings,

(c) a retainer having means extending vertically through said aligned openings and securing said cups together, and

(d) securing means connected to the upper end of said vertically extending means operative to secure said retainer to a belt loop of a user for transportation.

4,586,710

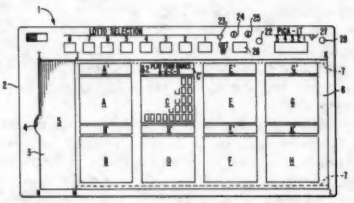
LOTTERY SELECTION DEVICE

Thomas E. Beam, 206 Pembroke Dr., Shillington, Pa. 19607

Filed May 18, 1984, Ser. No. 611,943

Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—138 A **17 Claims**



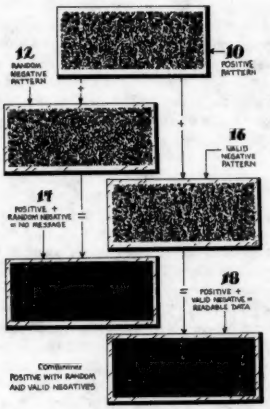
1. A lottery selection device comprising a rigid base member of a size suitable for being held in a person's hand, a lottery card receiving recess being formed in the top of the base member, a stencil member being secured over said recess in a manner enabling detachment thereof for use of another stencil and subsequent reattachment of said stencil for reuse thereof and said stencil having a plurality of grid areas, each grid area being provided with openings of a size and arrangement corresponding to a pattern of entry boxes on a lottery card intended for use with the selection device, said stencil member defining, in conjunction with wall areas of said recess, a slot which sufficiently closely conforms to the thickness and width dimensions of said lottery card intended for use with the selection device as to enable it to be retained in proper position under the stencil with the entry boxes in alignment with the openings of said grid areas, and illumination means located within said base member, below a bottom wall area of said card receiving recess and said grid areas, said bottom wall area being formed of light transmissive material in order to permit light from said illumination means to travel therethrough and illuminate said entry boxes.

4,586,711

MATCHING CARD GAME EMPLOYING RANDOMLY-CODED MONOCHROMATIC IMAGES

Simon N. Winters, Toms River, N.J., and Yiu T. Chu, New York, N.Y., assignors to Glenn E. Weeks, Fremont, Calif., a part interest

Filed May 10, 1983, Ser. No. 493,170
Int. Cl.[4] A63F 9/00
U.S. Cl. 273—138 R 16 Claims



5. A method of fabricating playing sheets for a chance game comprising the following steps:

(a) providing a humanly-recognizable two-dimensional pattern,

(b) scanning said pattern in adjacent parallel rows to compile the locations of the border areas of said pattern in each scanned row,

(c) generating for each row a first series of random binary elements,

(d) generating for each row a second series of binary elements,

(e) said first and second series of binary elements being generated such that the portion of said second series of binary elements corresponding to said pattern is the inverse of that of said first series of binary elements for said pattern, the pattern of binary elements of said second series for the portion of each row not within said pattern being random,

(f) printing a positive coded sheet in response to said first series of random binary elements, said positive coded sheet consisting of rows of elements corresponding to said rows in which said pattern was scanned, the elements of said rows being uniformly-shaped monochromatic geometric figures corresponding to said first series of random binary elements in each row,

(g) printing a negative coded sheet in accordance with said second series of random binary elements, said negative coded sheet consisting of rows of elements corresponding to said rows in which said pattern was scanned, the elements of said rows being monochromatic, uniformly-shaped geometric figures corresponding to said second series of binary elements in each row, and

(h) printing at least one dummy coded sheet consisting of rows of elements corresponding to said rows in which said pattern was scanned, the elements of said rows being monochromatic, uniformly-shaped geometric figures having a random distribution.

12. A chance game in which a winner is able to match a chosen or assigned playing piece with a universally-distributed playing piece to assemble a predetermined complete and intelligible pattern, said playing pieces comprising:

(a) first and second sheets of material,

(b) at least a portion of each of said sheets constituting a code portion and having a plurality of uniform geometric figures thereover, each of said figures having the same geometric shape and size, said figures being contiguous so as to occupy the entire surface of said code portion of each sheet,

(c) some of said uniform figures on said first sheet being monochromatic contrast areas which are

(1) substantially opaque to light, and

(2) arranged in positions so that in themselves they do not provide a complete or intelligible symbol,

(d) some of said monochromatic contrast areas on said first sheet occupying contiguous uniform areas so that each resultant set of contiguous monochromatic contrast areas will form a unitary monochromatic contrast area larger than a single uniform area,

(e) some of said uniform figures on said second sheet being monochromatic contrast areas which

(1) have a substantially different light reflectivity than the others and remainder of the uniform areas on said second sheet, and

(2) are arranged in positions so that in themselves they do not provide a complete or intelligible symbol,

(f) some of said monochromatic contrast areas on said second sheet occupying contiguous uniform areas so that each resultant set of contiguous monochromatic contrast areas will form a unitary monochromatic contrast area larger than a single uniform area,

(g) some of said others of said uniform figures on said second sheet also occupying contiguous uniform areas so that each resultant set of contiguous other figures on said second sheet will form a unitary other area larger than a single uniform area,

(h) the remainder of said uniform figures of said first sheet, other than said monochromatic contrast figures thereon, being substantially transmissive of light, such that at least some of said monochromatic contrast areas on said second sheet can be viewed through said light-transmissive areas of said first sheet when said first sheet is superimposed over said second sheet in a predetermined manner of registration,

(i) some of said others of the uniform figures on said second sheet also occupying contiguous ones of said uniform areas so that each resultant set of contiguous other areas on said first sheet will form a unitary other area larger than a uniform area,

(j) said monochromatic contrast areas on said first and second sheets each also containing encoded information of said of pattern such that when said first sheet is superimposed over said second sheet in said predetermined manner of registration, said monochromatic contrast areas of both sheets will combine and compliment each other when viewed in a direction perpendicular to said sheets so as to present said pattern in complete and intelligible form assembled of complimentary parts of said monochromatic contrast areas of said first and second sheets,

(k) said monochromatic contrast and the others of said uniform figures on said first sheet being distributed in a random fashion,

(l) said monochromatic contrast and the others of said areas on said second sheet also being distributed in a random fashion and having a complimentary arrangement to that of the monochromatic contrast areas of said first sheet in the portions of said sheets which present said pattern, and

(m) said monochromatic contrast areas of said first sheet having a non-complimentary arrangement to that of the monochromatic contrast areas of said second sheet in the portions of said sheets other than those portions which present said pattern,

(n) all monochromatic contrast and other areas on both sheets thereby having the same uniform shape and size, occupying the entire code portion of each said sheets, and providing large contrast and large other areas where

contiguous contrast areas and contiguous other areas exist,

whereby when said first and second sheets are superimposed in said predetermined pattern of registration, the coded image can be assembled more rapidly, with less tolerance, and with less possibility for error.

4,586,712

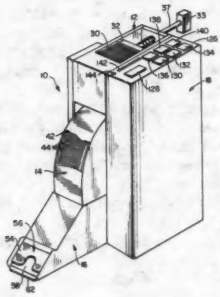
AUTOMATIC SHUFFLING APPARATUS

Harold Lorber; Ronald B. Lorber, both of 3225 Burn Brae Dr., Dresher, Pa. 19025; Lee H. Loeb, and Jeffrey C. Loeb, both of 22 Woodlyn Ave., Norristown, Pa. 19403

Filed Sep. 14, 1982, Ser. No. 417,885

Int. Cl.[4] A63F 1/12

U.S. Cl. 273—149 R **18 Claims**



1. An apparatus for continuously shuffling playing cards comprising a container for receiving playing cards to be shuffled, rotatably mounted storage means having a plurality of radially arranged spaces for individually storing shuffled playing cards, a stationary outer shell enclosing said storage means and having first and second openings each arranged in alignment with one of said spaces, shuffling means for randomly inserting through said first opening in said outer shell said playing cards in said container into empty spaces in said storage means, a dealing shoe for receiving said shuffled playing cards from said storage means, and supplying means for randomly supplying said shuffled playing cards from filled spaces in said storage means through said second opening in said outer shell to said dealing shoe.

4,586,713

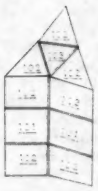
STAR PRISM PUZZLES

Ibrahim K. Abu-Shumays, and Mary D. Abu-Shumays, both of 1248 Varner Rd., Pittsburgh, Pa. 15227

Continuation-in-part of Ser. No. 604,941, Apr. 27, 1984, abandoned, which is a continuation-in-part of Ser. No. 394,869, Jul. 2, 1982. This application Dec. 28, 1984, Ser. No. 687,167

Int. Cl.[4] A63F 9/08

U.S. Cl. 273—153 S **7 Claims**



1. In a geometrical puzzle having the general shape of a large right prism, comprised of a core central part surrounded by exactly 3N+2 puzzle component pieces, where N is at least 3 (N=3, 4, 5, 6, etc.;

said core central part is comprised of N+2 fixed rod axes pivots emanating from the center of the puzzle; two of said N+2 fixed rod axes pivots point in opposite directions along the prism axis of said larage right prism (the prism axis being the line joining the geometric centers of the prism parallel bases), the remaining N of said N+2 fixed rod axes pivots are uniformly distributed in a plane passing through the geometric center of and being parallel to the bases of said large right prism;

said 3N+2 puzzle component pieces are initially stacked in three layers, each layer is bounded by two planes parallel to the bases of said large right prism; each of two layers of component pieces shares a base of said large right prism and is comprised of a puzzle base-center component piece surrounded by N puzzle corner component pieces of said right large prism; said puzzle base-center component piece is a right prism with N-sided regular polygon bases with one of its bases being along a base of said large right prism; said puzzle base-center component piece is mounted by a spring mechanism along the center of its unexposed base to one of the rod axes pivots lying along the prism axis; said puzzle base-center component piece is restricted to rotate freely in place around its prism axis; said N puzzle corner component pieces are predominantly right prisms which are identical to each other, and which have the same height as the height of said puzzle base-center component piece, one side face of each of said corner component pieces has the same size as and is initially situated abutting a side face of said puzzle base-center component piece; the shape of the bases of each of said N puzzle corner component pieces being such that in the initial position the combined base of the prism formed from said puzzle base-center component piece and any single one of said N puzzle corner component pieces forms a convex plane figure;

the remaining layer of component pieces is a middle layer of component pieces comprised of N identical predominantly right prism puzzle edge component pieces each having the same base as a base of each of said N puzzle corner component pieces; each puzzle edge component piece has one unexposed side face situated orthogonal to and being mounted at its center and fixed to one of said remaining N of said N+2 fixed rod axes pivots; each puzzle edge component piece is restricted to rotate freely in place around that rod axis pivot fixed to its unexposed side face;

initially each puzzle edge component piece is situated between two puzzle corner component pieces to form a long right prism; the puzzle edge component pieces together have cylindrical indentations with varying cylindrical radii forming internal edge grooves, the cross-section of each internal edge groove having the form of a forward or a backward letter J; in the initial position, the axes of the cylindrical grooves are the same as the prism axis of said large right prism; each puzzle corner component piece has a knob which fills, fits in and can move freely in and out of a groove in an adjacent puzzle edge component piece;

each puzzle base-center component piece can rotate around its prism axis together with all of its N adjacent corner pieces, the rotation being in a plane parallel to the bases of said large right prism; proper rotations in this case are in multiples of 360/N degrees; the knobs in the puzzle corner component pieces and the grooves in the puzzle edge component pieces must be large enough to prevent disassembly of the puzzle component pieces during such rotations;

each puzzle edge component piece can rotate together with its two adjacent puzzle corner component pieces in a plane parallel to the prism axis of said large right prism; proper rotations in this case are in multiples of 180 degrees; also the combination of knobs and grooves serves to prevent disassembly in this case;

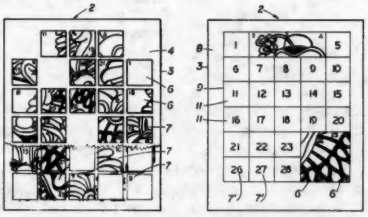
at least selected pairs of surfaces of said puzzle component pieces which coincide with each other in a rest position between rotations are initially modified at their centers by a combination of a small hemi-spherical knob on one and the same size hemi-spherical indentation on the other, the hemi-spherical knobs being identical to each other and being situated on surfaces of puzzle component pieces which are restricted to rotate in place, the corresponding hemi-spherical indentations being identical to each other and being situated on surfaces of the puzzle component pieces which migrate from place to place as a result of rotations; hemi-spherical knobs and indentations serve to stabilize the rest positions between admissible rotations; admissible rotations alter the relative positions of the puzzle component pieces and alter any initial external surface designs; the object and the challenge is to perform additional rotations to recover said initial external surface designs and to arrive at other new and interesting surface designs.

4,586,714

PUZZLE GAME

Leon G. Lenkoff; Roger J. Lenkoff, and Patrick J. Garry, all of Louisville, Ky., assignors to Stry-Lenkoff Co., Louisville, Ky.

Filed Dec. 13, 1984, Ser. No. 681,295
Int. Cl.[4] A63F *9/10*; B32B *31/18*
U.S. Cl. 273—157 R **14 Claims**



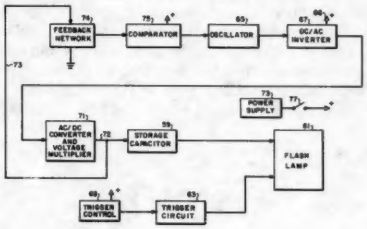
1. A puzzle game comprising at least one first defined back-up sheet area having a print sheet which includes separate segments of a picture image removably fastened to said back-up sheet area, each of said segments being of preselected geometric shape and being removably fastened to said back-up sheet in said first defined area in jumbled picture image fashion; and a second defined back-up sheet area having a visibly marked grid thereon comprising the same number of segments as are removably fastened in said first area with each segment of said grid having a geometrical size and shape equivalent to the size and geometry of at least one of the segments removably fastened in said first back-up sheet area whereby segments transferred from said first jumbled area and fastened in the proper segments in the grid in said second area form a correct picture image, said segments of said picture image each having the visual art thereon extended in conceptual form beyond the edges thereof and onto the print sheet adjacent the peripheries of said segments a preselected distance sufficient to accommodate for manufacturing tolerance to insure clear picture assemblage in the visible grid in said second defined area.

4,586,715

TOY LASER PISTOL

John E. Scolari, La Mesa; Robert T. Warner, Poway, and Joe E. Deavenport, San Diego, all of Calif., assignors to Life Light Systems, San Diego, Calif.

Continuation-in-part of Ser. No. 454,617, Dec. 30, 1982, abandoned. This application Jun. 7, 1984, Ser. No. 618,309
Int. Cl.[4] F41J *5/02*
U.S. Cl. 273—311 **38 Claims**



1. A toy laser weapon comprising:
handle means including grip means for gripping by the user;
elongated, substantially transparent barrel means having its proximal end mounted to and extending from said handle means;
flash lamp means within said weapon positioned to selectively project light through said barrel means;
a DC power source in said weapon;
flash lamp actuating means in said weapon for selectively, substantially instantaneously firing said flash lamp means for a single burst of high intensity light;
enabling switch means for selectively connecting said DC power source to said flash lamp actuating means for energizing said flash lamp actuating means when said weapon is in use to enable said flash lamp means to selectively emit a single burst of light immediately upon being triggered;
trigger switch means mounted to said handle means and connected to selectively actuate said energized flash lamp actuating means substantially instantaneously upon closing said trigger switch means to fire said flash lamp means, said flash lamp means including means to disable ability of said flash lamp means to fire when said trigger switch means is closed and when said enabling switch is open;
said flash lamp actuating means comprising:
storage capacitor means connected across said flash lamp means through said enabling switch means so that said storage capacitor means remains substantially uncharged when said enabling switch means is open; means coupled between said DC power source and said storage capacitor means for developing a charging voltage and applying said voltage to said storage capacitor means;
means to maintain said storage capacitor means at substantially full charge and to recharge said storage capacitor means immediately upon discharge through said trigger switch means when said enabling switch means is closed; and said charge maintaining means comprising feedback means coupled between said storage capacitor means and said charging voltage developing means.

4,586,716

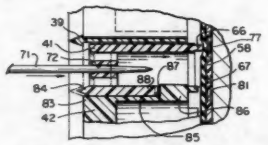
DOUBLE BULLSEYE FOR DART GAME

Robert J. Brejcha, and Leonard J. Kubacki, both of St. Charles, Ill., assignors to Industrial Design Electronic Associates, Inc., Sycamore, Ill.

Filed Apr. 17, 1984, Ser. No. 601,352
Int. Cl.[4] F41J *3/00*
U.S. Cl. 273—376 **1 Claim**

1. A target for an electronic dart game wherein said target is formed of a plurality of radially extending ribs and concentric

circular ribs to divide the target into a plurality of scoring segments, a double bullseye scoring means mounted within the inner concentric circular rib and comprising an outer annular target portion moveably mounted in said inner concentric circular rib, an inner generally cylindrical target portion mounted withn said outer annular portion and moveably mounted relative to said inner concentric circular rib, and switch means with a plurality of switch areas mounted to said target and actuated by said outer annular target portion and said inner cylindrical target portion when they are engaged by a dart so as to separately score hits by darts, wherein said outer annular target portion is non-rotatably mounted relative to said inner concentric circular rib, wherein said outer annular target portion is formed with a longitudinal key way and said inner concentric circular rib is formed with an extension which is receivable within said key way to prevent rotation of said outer circular target portion, wherein said outer annular target



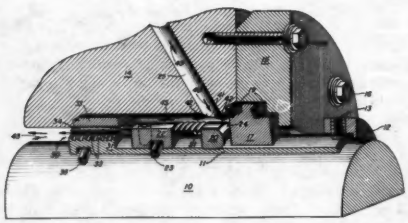
portion is formed with at least one extending foot which is engageable with a switch area of said switch means when said outer annular target portion is engaged by a dart to score an outer bullseye score, wherein said inner cylindrical target portion has at least one extending foot which is engageable with a switch area of said switch means when said inner cylindrical target portion is engaged by a dart to score an inner bullseye score, wherein said inner cylindrical target portion is formed with a first target portion which extends through the central opening of said outer annular target portion and a shoulder target portion which is larger in diameter than said first target portion which cannot pass through the central opening of said outer annular target portion, and wherein said outer annular target portion can move longitudinally relative to said inner cylindrical target portion to score an outer bullseye score without causing said inner cylindrical target portion to score an inner bullseye score.

4,586,717

THROTTLING BUSHING FOR SHAFT SEAL

William T. Sweeney, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Dec. 24, 1980, Ser. No. 219,748
Int. Cl.[4] F16J *15/34*
U.S. Cl. 277—15 **1 Claim**



1. A throttling bushing for an apparatus which includes a casing, a shaft journaled in said casing, a seal between said shaft and said casing, and fluid application means for cooling and flushing said seal, comprising:

labryinth means secured to said shaft to define a concentric labryinthine surface;

cylindrical bushing means secured within said casing for disposition adjacent said labryinth means and annularly spaced therefrom;

elastic means of cylindrical shape rigidly secured within said bushing means with the inner diameter of said elastic means disposed concentrically at a selected small spacing from the concentric definition of said labryinth means so that the elastic means may be stressed by fluid under pressure to allow passage of a selected amount of cooling and lubricating fluid; and

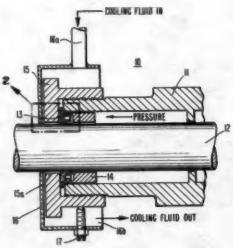
means secured to said bushing means and elastic means for retention against dislodgment relative to said casing.

4,586,718

SEALING ASSEMBLY WITH FLOATING GLAND MEANS FOR ROTATABLE SHAFTS

Edward J. Stephenson, Collegeville, and Raghavachari Kannan, Newtown Square, both of Pa., assignors to Crane Co., New York, N.Y.

Filed Sep. 6, 1985, Ser. No. 773,342
Int. Cl.[4] F16J *15/18, 15/46*
U.S. Cl. 277—22 **7 Claims**



1. A sealing assembly suited for use in a high temperature and/or high pressure environment with a device having a rotatable shaft, comprising:

a sealing ring comprising a body portion having a flange with an end face at one end thereof, said sealing ring being adapted to be mounted on the rotatable shaft and rotatable relative thereto,

gland means loosely mounted on the shaft adjacent said sealing ring, said gland means having a first recess to receive said body portion of said sealing ring, said gland means having a second recess surrounding said first recess to receive said flange of said sealing ring, said gland means being dimensioned relative to said sealing ring whereby said gland means is adapted to be loosely mounted on the shaft and said sealing ring for floating action relative thereto subject to the pressure of the environment, and

second gland means adapted to be secured to the device, said second gland means having a sealing surface adapted to engage said end face of said flange on said sealing ring, whereby when the pressure of the environment is directed along the rotatable shaft against said first-named gland means, said first-named gland means and said sealing ring are free to rotate on said rotatable shaft, and said flange of said sealing ring is forced against said sealing surface of said second gland means under the action of the pressure of the environment to provide a seal therebetween for the rotatable shaft.

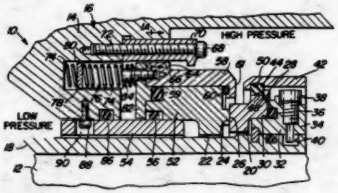
4,586,719
MECHANICAL SEAL

Joseph A. Marsi, Rancho Palos Verdes; Winfred J. Wiese, Whittier; Lawrence I. Takumi, Carson; Clark S. Roster, Whittier; Gordhan K. Vaghasia, Cerritos; Jerel E. Ellison, Downey, and Alan B. Coleman, South Pasadena, all of Calif., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 496,322, May 19, 1983. This application Sep. 4, 1984, Ser. No. 646,887

Int. Cl.[4] F16J *15/34*

U.S. Cl. 277—41 **16 Claims**



1. A mechanical seal assembly for separating a high pressure fluid and a lower pressure fluid, and associated with a rotatable shaft and a stationary housing, said assembly comprising:

a rotatable seal ring connected to said shaft;

a non-rotatable seal ring connected to said housing for limited axial movement;

a plurality of coil springs;

a ring-like spring holder having front and rear surfaces;

a plurality of spring pockets in said holder, some of which open to said front surface and some of which open to said rear surface; and

means in said housing supporting said spring holder relative to said non-rotatable seal ring so that said springs resiliently urge said non-rotatable seal ring axially toward said rotatable seal ring.

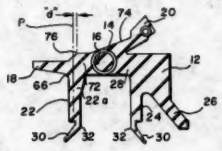
4,586,720
NECK SEAL

Thomas E. Simmons, Westford; Ralph F. Divirgilio, Jefferson, and Charles L. Innis, Jr., Paxton, all of Mass., assignors to Morgan Construction Company, Worcester, Mass.

Filed Jan. 23, 1985, Ser. No. 693,796

Int. Cl.[4] F16S *15/32*

U.S. Cl. 277—152 **10 Claims**



1. A seal for use on the tapered section of a roll neck in a rolling mill, said seal comprising: a flexible circular body having a circular lip and a circular flange at one end thereof, said flange extending radially from said body and normally with respect to the body axis when said seal is in an unstressed condition, said lip extending axially from said body on one side of a reference plane normal to the body axis and extending through said flange, said seal being adapted to be axially received on and to be radially stressed by said tapered roll neck section with an accompanying radial expansion of said lip which produces a first bending moment tending to angularly distort said flange from its normal orientation to the seal axis, and an inwardly protruding circular shoulder on said seal body located on the opposite side of said reference plane, said shoulder being arranged to coact with said tapered roll neck section in producing a second bending moment counteracting said first bending moment.

4,586,721
CONVERTIBLE STROLLER

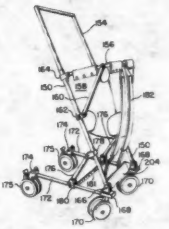
Steve N. Harada, and Kathleen L. Harada, both of P.O. Box 798, Coupeville, Wash. 98239

PCT No. PCT/US84/02026, § 371 Date Dec. 7, 1984, § 102(e) Date Dec. 7, 1984

Continuation-in-part of Ser. No. 429,253, Sep. 30, 1982, Pat. No. 4,487,428. This PCT application Dec. 7, 1984, Ser. No. 684,839

Int. Cl.[4] B62B *7/12*

U.S. Cl. 280—30 **6 Claims**



1. A stroller which may be partially collapsed and carried as a backpack or fully collapsed for storage comprising:

a rigid main frame member of rectangular configuration,

a lower wheeled element hingedly secured to one end of the frame member, said wheeled element being independently has selectively movable from a collapsed position adjacent the main frame member to an extended position at an acute angle to the main frame member, an infinitely adjustable support member interconnecting the main frame member and the wheeled element, said support member locking the wheeled element in position,

an upper child supporting frame element supporting a seat, said frame element being independently and selectively movable from a collapsed position adjacent the main frame member to an extended position at an acute angle to the main frame member on the opposite side of the main frame member from the wheeled element,

an infinitely adjustable support member interconnecting the frame member and the child supporting frame element and,

shoulder strap means secured to the frame member and the frame element whereby the wheeled element may be collapsed and the unit carried as a backpack while the frame element is in either the child supporting position or the collapsed position.

4,586,722
ALL-WHEEL-STEERABLE VEHICLE

Masaki Watanabe, Saitama; Akio Yagasaki, Tokyo, and Yoshinori Matsuoka, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 23, 1984, Ser. No. 633,370

Claims priority, application Japan, Jul. 22, 1983, 58-132919

Int. Cl.[4] B62D *7/06*

U.S. Cl. 280—103 **5 Claims**

1. An all-wheel-steerable vehicle comprising:

two front wheels having a pair of balloon tires;

two rear wheels having a pair of balloon tires;

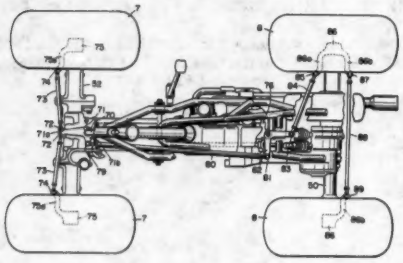
a saddle seat for allowing a driver to ride astride the vehicle;

steering means for steering said front wheels and said rear wheels in interlinked relation;

said steering means being adapted to steer said front wheels

and said rear wheels in the opposite direction to each other, with the steering angle of said front wheels being greater than the steering angle of said rear wheels; and

said steering means comprising a handle, a steering stem operatively connected to said handle, a front lever connected to said steering stem, said front lever having a first arm and a second arm, front tie rods connecting said first



arm of said front lever with front knuckles of said front wheels, respectively, a rear lever operatively connected to rear knuckles of said rear wheels, said rear lever having a first arm operatively connected to said rear knuckles and a second arm, and a longitudinal link member for connecting between said second arm of said front lever and said second arm of said rear lever.

4,586,723

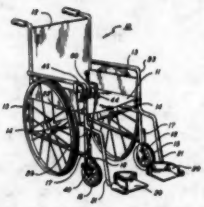
STEERING DEVICE FOR A WHEELCHAIR

Herman G. Nabinger, 311 Kirk Ave., Syracuse, N.Y. 13205

Filed Mar. 1, 1982, Ser. No. 353,611

Int. Cl.[4] B62M *1/14*

U.S. Cl. 280—242 WC **7 Claims**



1. Apparatus for steering a wheelchair having at least one caster carried within a fork for rotatably supporting the caster within the frame of the chair, said apparatus including

a steering rod having a center column that is connected to an upper drive section and a lower drive section by a pair of universal joints,

a bearing block for mounting in the upper part of the frame in which the upper drive section of the shaft is rotatably supported,

a clamping means secured to the caster fork for movement with said fork, said clamping means further including a slide means for slidably engaging the lower drive section of the steering rod to permit the clamping means and the lower drive section to move axially in relation to each other as the rod sections are displaced about said universal joints, and

a crank means operatively connected to the upper drive section of the steering rod to turn the rod in the bearing block and thus impart a turning motion to the caster.

4,586,724

HITCH ASSEMBLY

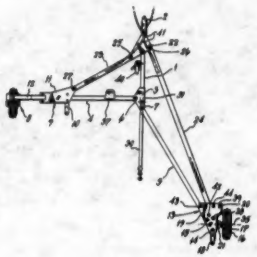
Ronald S. Sargent, Kenilworth, and Bryan J. Morris, Coventry, both of United Kingdom, assignors to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Apr. 9, 1984, Ser. No. 597,998

Claims priority, application United Kingdom, Apr. 8, 1983, 8309569

Int. Cl.[4] B60D *1/00*

U.S. Cl. 280—412 **7 Claims**



1. A hitch assembly comprising a hitch bar having a hitch for attachment to a tractor at its leading end; a pair of drawbars each having one end pivotally connected to the hitch bar so as to be swingable in a substantially horizontal plane between a work position in which it extends laterally to the direction of travel, one on each side of the hitch bar, and with the outer end of one drawbar extending rearwards further than the outer end of the other drawbar, and a transport position in which each trails rearwards of the work position; a wheel assembly that carries a support wheel with its axis in a fixed orientation relative to the wheel assembly; a connection between said one drawbar and the wheel assembly comprising a pivotal connection with a vertical axis about which the wheel assembly can pivot relative to said one drawbar in moving the latter from the work to the transport position; a support wheel attached to the outer end of said other drawbar; a hitch on each drawbar for attachment to an implement, the hitch on said one drawbar trailing behind that on said other drawbar in the work position; and a pair of stay bars each having one end pivotally connected to the hitch bar so as to be swingable in a substantially horizontal plane between work and transport positions, one stay bar in its work position being connectable by a fastening to said wheel assembly to hold said one drawbar in said work position, and the other stay bar in its work position being connectable by a fastening to said other drawbar to hold it in said work position.

4,586,725

TRAILER FOR TAKING A BOAT OUT OF THE WATER AND TRANSPORTING IT

René H. Jeanson, Auzay, France, assignor to Valeo, Paris, France

Filed Feb. 14, 1985, Ser. No. 701,625

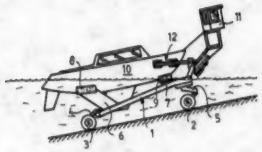
Claims priority, application France, Feb. 15, 1984, 84 02278

Int. Cl.[4] B60P *3/10*

U.S. Cl. 280—414.1 **7 Claims**

1. A trailer for taking boats, more especially pleasure boats, out of the water and transporting them, comprising a chassis (1) comprising two vertical pivots (14*a*, 14*b*) disposed symmetrically with respect to its longitudinal axis (15), two retainer arms (13*a*, 13*b*) pivotably mounted on pivots (14*a*, 14*b*) and forming a V open towards the rear of the chassis and intended to receive the front part of the hull of the boat (10) therebetween, an actuating cylinder (16) connecting the arms (13*a*, 13*b*) together at their front part for positioning them or causing them to pivot symmetrically with respect to the longitudinal axis (15) of the chassis, two pad holders (17*a*, 17*b*) mounted for

pivoting about vertical pivots (18*a*, 18*b*) provided at the rear ends of the retainer arms (13*a*, 13*b*), and gripper pads (19*a*, 19*b*) pivotably mounted on the pad holders (17*a*, 17*b*), characterized in that the retainer arms (13*a*, 13*b*) comprise identical toothed sectors (20*a*, 20*b*) centered on the pivots (14*a*, 14*b*) of the chassis (1) and whose teeth are in engagement along the longitudinal axis (15) thereof, and in that the pad holders (17*a*, 17*b*) are pivotably connected to auxiliary arms (21*a*, 21*b*) mounted for pivoting on the pivots (14*a*, 14*b*) of the chassis (1), these auxiliary arms comprising in their turn identical toothed sectors (22*a*, 22*b*) centered on the pivots (14*a*, 14*b*) of the chassis (1) and whose teeth are also in engagement along the longitudinal axis (15) thereof.



4,586,726

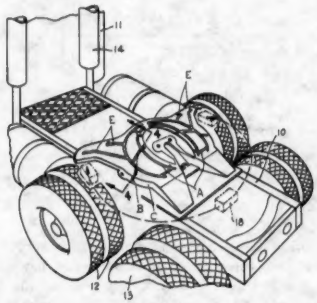
FIFTH WHEEL WITH STOP MEANS

Grover H. Capps, Rte. 2, Box 388, Travelers Rest, S.C. 29690

Filed Apr. 9, 1984, Ser. No. 597,928

Int. Cl.[4] B62D *53/08*

U.S. Cl. 280—432 **6 Claims**



1. A fifth wheel for use in connecting a tractor and a trailer having a stop carried beneath a bottom surface of the trailer for limiting relative pivotal movement between the tractor and the trailer comprising:

a plurality of interconnected grease channels opening in an upper bearing surface of an upper plate of said fifth wheel;

a plurality of circumferentially spaced grease fittings adapted to accommodate a grease gun and the like, each opening into a passageway communicating with said grease channels;

said fifth wheel having a depending skirt containing a compartmentalized lower portion and a plurality of circumferentially spaced housings in said skirt opening at the outside thereof accommodating each of said grease fittings;

wedge-shaped integral continuations of said skirt and upper plate forming spaced opposed ears carried by a forward portion of said fifth wheel for engaging said stop limiting the angular movement of the stop therebetween, relative pivotal movement between the tractor and trailer during turning being limited by the angular movement of the stop between the opposed ears;

each said ear including an extended upper bearing surface contiguous and flush with said bearing surface of said upper plate providing an increase bearing surface for supporting said trailer and providing increased stability to the trailer in relation to the tractor;

grease channels in said upper bearing surface of each of said opposed ears; and

grease fitting means carried in housing means in said fifth wheel communicating with said grease channels in an upper bearing surface of each of said opposed ears.

4,586,727

VARIABLE-HEIGHT DEVICE FOR SUPPORTING A BOOT ON A SKI

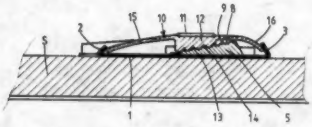
Louis Andrieu, St Pierre le Moutier, and Henri Peyre, Nevers, both of France, assignors to STE LOOK, Nevers, France

Filed Nov. 6, 1984, Ser. No. 668,987

Claims priority, application France, Nov. 30, 1983, 83 19100

Int. Cl.[4] A63C *9/00*

U.S. Cl. 280—607 **5 Claims**



1. A variable-height device for supporting a boot on a ski, wherein said device comprises:

a stationarily fixed base which is intended to be mounted on the ski,

a readily accessible control member guided within the stationarily fixed base in order to slide therein along the axis of the ski,

a support plate which is securely attached to the stationarily fixed base in a plane parallel to the ski but is capable of vertical displacement, said control member and said support plate being provided with complementary bearing surfaces in the form of stair-steps with inclined risers which extend in the longitudinal direction of the ski, and

resiliently actuated catch-engagement means adapted to lock the control member in the desired position, said support plate having flexible front and rear portions of which elastic deformation has the effect of urging said catch-engagement means to the locking position.

4,586,728

VEHICLE SUSPENSION MEANS HAVING VARIABLE SUSPENSION CHARACTERISTICS

Toshimichi Tokunaga, and Seita Kanai, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 27, 1984, Ser. No. 583,646

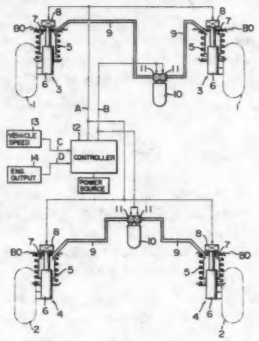
Claims priority, application Japan, Feb. 28, 1983, 58-33029; Mar. 15, 1983, 58-43833

Int. Cl.[4] B60G *11/26*

U.S. Cl. 280—707 **8 Claims**

1. A suspension system for motor vehicles comprising suspension means having suspension characteristics which are variable between hard and soft modes, adjusting means for changing the suspension characteristics of the suspension means, vehicle speed detecting means for detecting vehicle speed and producing a vehicle speed signal, engine power output level detecting means for detecting engine power output level and producing an engine power output level signal, control means connected with said vehicle speed detecting means and said engine output detecting means to receive said signal therefrom to detect a vehicle operating range wherein engine output is substantially larger than the output necessary

to maintain constant speed vehicle operation and to produce a control signal which is applied to said adjusting means to



adjust the suspension means into the hard mode when the vehicle is within said vehicle operating range.

4,586,729

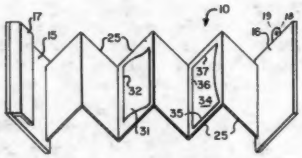
MAGNETIC COVERED FOLIO CASE

George Beylerian, c/o Beylerian Ltd. 305 E. 63rd St., New York, N.Y. 10021

Filed Apr. 27, 1984, Ser. No. 604,724

Int. Cl.[4] B42D *13/00, 1/00, 17/00;* **B41L** *1/20*

U.S. Cl. 281—5 **20 Claims**



1. A magnetic covered folio case comprising:

a pair of magnetizable cover members having oppositely polarized areas drawing one cover member towards the other when they are brought into facing proximity;

a plurality of hingedly attached folio sheets arranged edge to edge between said cover members in an accordian folded configuration; and

pocket forming elements on at least some of said sheets.

4,586,730

CLIPBOARD

Lev Shulyak, Worcester, Mass., assignor to Shel Industries, Inc., Boston, Mass.

Filed May 30, 1984, Ser. No. 615,316

Int. Cl.[4] B42D *17/00;* **A47B** *97/02*

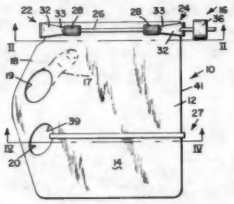
U.S. Cl. 281—45 **8 Claims**

1. Clipboard comprising:

(a) a generally rectangular flat board having a top edge, a bottom edge, a first side edge, and a flat upper surface for supporting a sheet of writing material,

(b) a clamp mounted on the top surface at the upper end of the board for holding the sheet of writing material on said surface,

(c) an outwardly extending flange having a second side edge which is opposite said first side edge and having an aperture adapted for receiving a user's thumb for holding the clipboard, said second side edge and said aperture being substantially outside of the area of said upper surface which extends between said top and bottom edges and,



(d) a hold-down bar which is removably attached to said clipboard so that it extends from said aperture to the opposite side edge of said clipboard.

4,586,731

TUBE FITTING WITH FERRULE

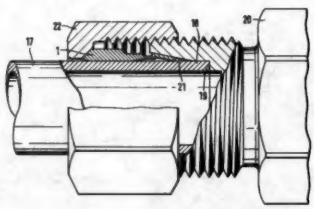
Rolf Castrup, Versmold-Oesterweg, Fed. Rep. of Germany, assignor to Ermeto Armaturen GmbH, Bielefeld, Fed. Rep. of Germany

Filed Sep. 20, 1984, Ser. No. 652,779

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1983, 3333866

Int. Cl.[4] F16L *19/08*

U.S. Cl. 285—4 **4 Claims**



1. A tube fitting, comprising

a connecting piece having an inner conical surface,

a coupling nut threaded to said connecting piece,

a one-piece ferrule disposed between said connecting piece and said nut and adapted for deformation into engagement with a tube upon relative axial closing movement of said connecting piece and said nut,

said ferrule, comprising

a generally cylindrical body member having a bore and an outer wall,

a frusto-conical front cutting ring at one end of said body member engageable with said inner conical surface of said connecting piece, said front cutting ring having a front cutting edge of one diameter at the forward portion thereof,

a rear cutting ring connecting said body member and said front cutting ring, said rear cutting having a rear cutting edge at the forward portion thereof of a diameter greater than the diameter of said front cutting edge and said body member bore, and

an annular groove in said outer wall of said ferrule, said groove having a front shoulder, back shoulder and a cylindrical intermediate surface forming a part of said rear cutting ring, said front shoulder being disposed rearwardly of said rear cutting edge to provide a shear section therebetween and between said first and second cutting rings, said front cutting ring comprising substantially parallel inner and outer frusto-conical wall surfaces ex-

tending axially substantially from said front cutting edge to said rear cutting edge,

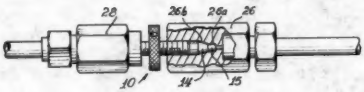
said rear cutting ring having an inner surface formed of a frusto-conical surface extending forwardly and outwardly from said body member bore and a cylindrical surface extending forwardly from said frusto-conical surface and terminating in said rear cutting edge, said rear cutting ring being thinner than said body member and adapted to be sheared from said front cutting ring upon makeup of said fitting and to be deformed so that said intermediate surface of said groove is in a substantially frusto-conical configuration closely adjacent and substantially fully nested beneath said front cutting ring.

4,586,732

CONNECTOR FOR LIQUID CHROMATOGRAPHY DEVICES

James M. Anderson, Jr., Arlington Heights, Ill., assignor to Alltech Associates, Inc., Deerfield, Ill.

Filed Feb. 17, 1984, Ser. No. 581,369
Int. Cl.⁴ F16L *19/00*
U.S. Cl. 285—12 **3 Claims**



1. A connecting device for interconnecting the threaded end fittings of two liquid chromatography devices in closely adjacent relationship, each end fitting having a throughbore for the passage of liquid therethrough, an axially aligned concentric counterbore and an inwardly tapering, outwardly facing seat, said connecting device comprising an elongated, inert plastic body having a throughbore extending therethrough for the passage of liquids, said body comprising an externally threaded central portion; a pair of cylindrical unthreaded shank portions, a pair of narrow cylindrical pilot portions and a pair of outwardly facing ferrule seats; said cylindrical shank portions being disposed outwardly on opposite sides of said central portion, said cylindrical pilot portions each being disposed at a respective end of said body for extending into and substantially filling the counterbore of the associated chromatography device end fitting, and each of said ferrule seats being disposed intermediate a respective shank portion and pilot portion for sealingly engaging the similarly tapered inwardly facing seat within the associated chromatography device end fitting; and an enlarged grip removably secured to extending outwardly from and circumferentially about the central portion of said body, whereby said grip may be manually manipulated to threadedly engage the threaded end fittings of two liquid chromatography devices and to cause the pilot portions to enter and substantially fill the counterbores of the respective end fittings and the outwardly facing tapered ferrule seats to sealingly engage the correspondingly tapered inwardly facing seats within the respective end fittings.

4,586,733

ADAPTER COUPLING FOR LIQUID CHROMATOGRAPHY DEVICE

James M. Anderson, Jr., Arlington Heights, Ill., assignor to Alltech Associates, Inc., Deerfield, Ill.

Filed Feb. 17, 1984, Ser. No. 581,372
Int. Cl.⁴ F16L *25/00, 33/00*
U.S. Cl. 285—12 **9 Claims**

1. A universal adapter for holding a piece of tubing in fluid sealing relationship alternatively with either an internally or externally threaded coupling member for liquid chromatography equipment, said adapter comprising

a. a holder including axially aligned first and second holder segments,

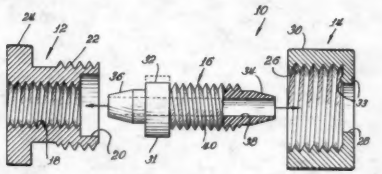
b. means matingly securing together said first and second holder segments,

c. a central passage extending axially between opposite ends of said holder through said holder segments when secured to one another, at least a portion of the central passage extending through said first holder segment being internally threaded for mating with a coupling member having external threads,

d. an enlarged central cavity in said holder in registration with said central passage, and

e. an elogated sealing insert for said holder, said insert being situated partially in said passage and including

i. a first end portion disposed wholly within the internally threaded portion of the central passage of said first holder segment,



ii. a second end portion extending outwardly beyond said second holder segment, said second portion being externally threaded for mating with a coupling member having internal threads,

iii. a longitudinal bore extending the length of said insert and adapted to receive therethrough a piece of tubing,

iv. an integral ferrule seat formed at each end portion thereof, and

v. an enlarged collar intermediate said first and second end portions, said collar being located in the enlarged central cavity of said holder,

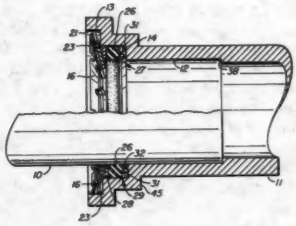
whereby said first and second holder segments will hold said insert in position for sealing engagement with the coupling member when the adapter and coupling member are threadedly engaged.

4,586,734

PIPE JOINT ASSEMBLY

Wilfred J. Grenier, Rutland, Mass., assignor to General Industries, Inc., Rutland, Mass.

Filed Dec. 8, 1982, Ser. No. 447,747
Int. Cl.⁴ F16L *37/08*
U.S. Cl. 285—340 **14 Claims**



1. A coupling assembly for use in connecting a first tubular member at a first end thereof to a component of a piping system, said assembly comprising;

an embracing tubular member on said component for receiving said first tubular member, said embracing member

having an inner bore dimensioned for snugly receiving said first end, said bore having first and second inner shoulders proximate the receiving end thereof;

an annular locking member of generally frustoconical shape dimensioned to abut against said first shoulder, said locking member having an outer rim engaging an inner wall of said embracing member and an inner rim extending toward said second shoulder and protruding slightly into said bore when in seated position, said inner and outer rims having slotted edges;

an annular guard member having a flat portion dimensioned to seat against said second shoulder and a second portion angled to extend toward said receiving end when said guard member is in seated position;

an annular sealing member dimensioned to abut against said guard member; and

a rigid annular member dimensioned to abut against said sealing member and formed to urge said locking member into tighter locking configuration when said sealing member is deformed thereagainst;

wherein said first and second shoulders are spaced apart a characteristic distance so that said locking, rigid, sealing, and guard members engage one another when in their seated and abutting positions.

4,586,735

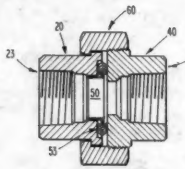
GASKETED PIPE UNION

Donn Innes, Shavertown, Pa., assignor to Nicholson Division, Datron Systems, Inc., Wilkes-Barre, Pa.

Filed Jan. 25, 1984, Ser. No. 573,848

Int. Cl.⁴ F16L *19/02*

U.S. Cl. 285—354 **1 Claim**



1. A system of rigid piping wherein individual sections of pipe are joined by a gasketed pipe union comprising:

a. an annular connection stub having a coaxial bore therethrough with a front end having arresting means concentric thereto for securing said stub, a plurality of chambers therein and a back end for joining to a section of piping;

b. a connection ring having a pressure face, with a coaxial bore therethrough, opposed to said stub front end and external securing means concentric thereto for joining said union and a rear end for joining to a section of piping;

c. means for centering and sealing comprising a rigid cylinder of predetermined circumference fitting inside one of said plurality of chambers with a flange around one end for exactly fitting inside another one of said plurality chambers and having a gasket of predetermined circumference surrounding said flange in the form of a spiral wound gasket seated in said another chamber and forming an hermetic seal at said union of said face and said front end; and

d. locking means of predetermined circumference concentric to said stub for engaging said arresting means and said securing means simultaneously to maintain said gasket in hermetic sealing engagement with said face and front end and to coaxially join the sections of piping.

4,586,736

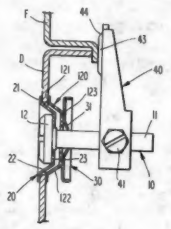
FLUSH MOUNTING CUP FOR CABINET LATCH

Robert W. Dougherty, Media, Pa., assignor to Southco, Inc., Concordville, Pa.

Filed Jun. 4, 1984, Ser. No. 616,918

Int. Cl.⁴ E05C *3/04*

U.S. Cl. 292—202 **5 Claims**



1. A latch mechanism having a pawl shaft inserted through a hole in a cabinet door panel, said shaft having an enlarged head at its outward end; said mechanism including:

a. a first cup supported on said shaft, said cup having a cross-section corresponding in shape to the shape of the hole in the door panel;

b. said cup having a preselected depth in the axial direction of said shaft;

c. said cup having at its inward end a radially-inward flange terminating short of the center axis of the cup defining a hole in said cup through which said shaft passes;

d. said cup having a radially outward flange at its outward end, the inner dimensions of said outward flange corresponding to the dimensions of said hole;

e. said cup positioned in said hole in said door panel; and

f. a retainer clip on said shaft positioned to hold the radially outward flange of said cup tightly against the outward surface of said door panel at the periphery of said hole.

4,586,737

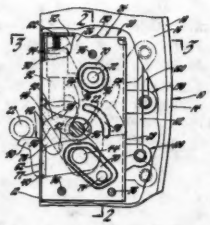
VEHICLE BODY DOOR LOCK

Alfonsas Arlauskas, Sunny Hills, Fla., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 22, 1984, Ser. No. 643,170

Int. Cl.⁴ E05C *3/26*

U.S. Cl. 292—216 **8 Claims**



2. A closure latch, comprising in combination, a frame, a fork type bolt mounted on the frame for rotational movement between locked and unlocked positions and including a pair of legs defining a striker receiving throat, a housing mounted to the frame and including a linear passageway opening to the path of rotational movement of the legs of the bolt, an elongated detent member slidably mounted within the passageway of the housing for linear reciprocal movement between an extended detented position in the path of rotational movement

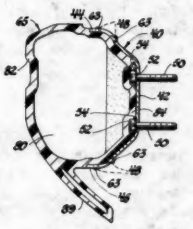
of the legs of the bolt and a retracted undetented position out of such path of movement, resilient means biasing the detent member to detented position, means locating the detent member in detented position under the bias of the resilient means, movable operating means including an intermittent member selectively movable (1) to a first position wherein movement of the operating means engages the intermittent member with the detent member to move the detent member to undetented position against the bias of the resilient means, and, (2) to a second position wherein the intermittent member bypasses the detent member upon movement of the operating means to permit the resilient means to maintain the detent member in detented position, and means for selectively moving the intermittent member to the first and second positions.

4,586,738

MOLDED PLASTIC BUMPER AND MOUNTING BRACKET ASSEMBLY

Gary M. Butler, Pontiac, and Frank J. Bakewicz, Grosse Point Woods, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 14, 1985, Ser. No. 691,462
Int. Cl.[4] B60R *19/02*
U.S. Cl. 293—107 **3 Claims**



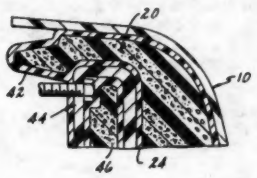
1. A unitized lightweight bumper assembly for direct attachment to laterally spaced support structures of a vehicle having vehicle body work comprising an elongated resilient and jointless hollow shell with continuous and uninterrupted walls blow molded from homogeneous thermoplastic material to predetermined width and height, said hollow shell forming at least one closed cell and having outer and inner faces spaced from one another by top and bottom wall means, laterally spaced metallic bracket means directly contacting and directly attached to said inner face, and fastener means associated with said bracket means for connection of said shell as a bumper beam to said laterally spaced support structure of said vehicle and outwardly of said body work whereby a load of predetermined magnitude to said shell between said brackets is dissipated by the inward beam deflection of a portion of said entire shell between said bracket means toward the bodywork of said vehicle and wherein said deflected portion of said entire shell recovers to its normal undeflected position after removal of said load, said bumper being adapted to energy of a load directed to a section of said outer face thereof substantially in line with at least one said bracket means by deflection of said section of said outer face relative to said inner face and toward said one of said bracket means.

4,586,739

VEHICLE BUMPER

Norman S. Loren, Warren, and William E. Gordon, Sterling Heights, both of Mich., assignors to Michael Ladney, Jr., Sterling Heights, Mich.

Division of Ser. No. 624,202, Jun. 24, 1984, which is a continuation-in-part of Ser. No. 568,215, Dec. 30, 1983, abandoned. This application Oct. 24, 1985, Ser. No. 790,942
Int. Cl.[4] B60R *19/08*
U.S. Cl. 293—120 **16 Claims**



1. A vehicle bumber, comprising: a fascia having a front portion adapted to receive impact forces and upper and lower flanges extending rearwardly from said portion;

a backing member positioned rearwardly of the front portion of the fascia and extending vertically between said upper and lower flanges in spaced relation therebetween, said member including means for mounting the bumper on the vehicle;

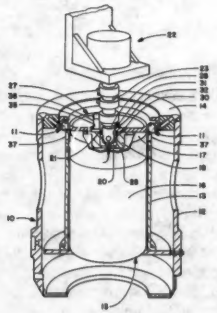
a resiliently compressible plastic foam molded in situ within at least a substantial portion of the volume contained by the fascia and embedding at least part of the backing member therewithin, said foam having an integral skin bonded to the interior surfaces of the fascia and the surfaces of the backing member.

4,586,740

LATCH ASSEMBLY

James R. Frederickson; William H. Harper, both of Richland, and Raymond Perez, Lynnwood, all of Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 17, 1984, Ser. No. 641,547
Int. Cl.[4] A47F *13/06*
U.S. Cl. 294—1.1 **6 Claims**



1. A latch assembly for releasably securing an article in an apparatus housing having a side wall and a bottom wall comprising: a latching cam mounted on said housing wall for pivoted movement between an operative position and an inoperative position wherein said cam is triangular in side elevation and formed with a first portion of solid thickness and a second

bifurcated portion defining laterally spaced legs, means biasing said cam into said operative position projecting into the interior of said housing, said cam urged into said inoperative position by said article upon entry thereof into said housing, means maintaining said cam in said inoperative position upon passage of said article therepast into a final position seated on the housing bottom wall, said biasing means snapping said cam into latching engagement against said article upon displacement of said maintaining means relative to said cam to secure said article in place against said housing bottom wall and including a pivot pin mounted on said housing wall and extending through said cam first portion, means on said second portion for supporting a roller between said legs, and means on said second portion spaced from said supporting means for mounting a spring biased piston thereon.

4,586,741

FLASHLIGHT HOLDER

Elliott J. Muti, 3423 E. Pratt St., Baltimore, Md. 21224

Filed Jul. 20, 1984, Ser. No. 632,643
Int. Cl.[4] B25J *1/02;* **F21V** *21/08*
U.S. Cl. 294—19.1 **13 Claims**

1. A flashlight holder, comprising:

an elongated extension rod component having a longitudinal axis, said extension rod component being substantially symmetric about the longitudinal axis and being for a distant extension to a remote area and having an upper and a lower end;

a carrier arm component, said carrier arm component being suitably affixed to said lower end of said extension rod component, said carrier arm component being capable of being set at a plurality of angles of 90° or plus or minus angles therefrom; and

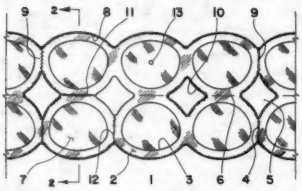
a plurality of flexible strap means each comprising a strap body means and a buckle means, said buckle means being suitably affixed to said strap body means, said plurality of flexible strap means being spaced apart and suitably affixed to said carrier arm component, said plurality of flexible strap means being for the purpose of affixing a flashlight to said carrier arm component, said flashlight being capable of affixation to said carrier arm component without the use of a tool.

4,586,742

SANITARY RING PACKAGING

Jung G. Lew, 7890 Oak St., Arvada, Colo. 80005

Filed Aug. 7, 1978, Ser. No. 931,774
Int. Cl.[4] B65D *75/00, 85/62*
U.S. Cl. 294—87.2 **2 Claims**



1. The sanitary packaging rings used in binding cans together, said sanitary packaging rings comprising:

(a) a thick plastic sheet having a plurality of near-circular shaped cut-outs disposed in the pattern of multiple rows, each of said near-circular shaped cut-outs being able to be enlarged by stretching and inserted around the cans in tight relationship; whereby, said thick plastic sheet having a plurality of near-circular shaped cut-outs binds a plurality of cans together;

(b) a thin plastic sheet superimposed to said thick plastic sheet wherein said two plastic sheets are bonded to each other along the outer edge of said thick plastic sheet; whereby, said thin plastic sheet covers the tops of the cans bound together by said thick plastic sheet; and

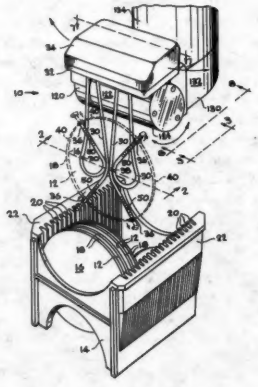
(c) said combination of thick plastic sheet and thin plastic sheet made in a long strip having stitch cuts disposed at a regular interval intermediate adjacent said near-circular shaped cut-outs, along said stitch cuts said thin plastic sheet is further bonded to said thick plastic sheet; whereby, said sanitary packaging rings in a strip form can be separated into a plurality of sanitary packaging rings of shorter length.

4,586,743

ROBOTIC GRIPPER FOR DISK-SHAPED OBJECTS

Alan T. Edwards, and Steven A. Smith, both of Corvallis, Oreg., assignors to Intelledex Incorporated, Corvallis, Oreg. and Applied Materials, Inc., Santa Clara, Calif., a part interest

Filed Sep. 24, 1984, Ser. No. 654,306
Int. Cl.[4] B25J *15/00*
U.S. Cl. 294—86.4 **23 Claims**



1. A robotic gripper as may be used for picking up, support-

ing, and releasing a disk-shaped object by mechanically engaging only said object's edge surface comprising,

a plurality of fingers having tips which may be extended outward from or retracted inward to said object's edge surface, the tips of said fingers being respectively located at individual positions spaced about said object's edge surface, said plurality of fingers being mechanically joined together into a unitary assembly at a single location lying within the perimeter of the area enclosed by a polygon having its verticies at each of the fingertips, and

fingertip actuator means for extending the tips of said fingers outward from or withdrawing them inward toward said object's edge surface.

4,586,744

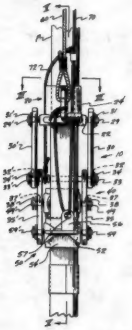
APPARATUS FOR LIFTING AND HANDLING AN OBJECT

Marvin L. Price, Rte. 1, Box 490, Mill Spring, N.C. 28756

Filed Jun. 18, 1984, Ser. No. 621,547

Int. Cl.[4] B66C *1/44*

U.S. Cl. 294—92 **12 Claims**



1. A lifting assembly comprising:

(a) first means for engagement with a portion of an object to be lifted;

(b) a first pair of arms pivotally secured at opposite sides of said first engagement means;

(c) a second pair of arms pivotally secured to said first pair of arms at an opposite end of same;

(d) second means for engagement with a further portion of said object along a side generally opposite said first means, said second means being pivotally secured between one of said pairs of arms intermediate the length of same;

(e) third means for engagement with a further portion of said object along the same general side engageable by said first engagement means; and

(f) assembly lifting means secured to said first engagement means, whereby when force is applied to said lifting means, said first, second and third engagement means are maintained in holding engagement with said object.

4,586,745

SKI SLING

John S. Shepard, 1304 S. Shields, Ft. Collins, Colo. 80521

Filed Apr. 16, 1981, Ser. No. 254,886

Int. Cl.[4] B65P *45/04*

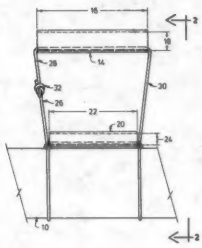
U.S. Cl. 294—150 **4 Claims**

1. A ski sling comprising:

a first elongated hollow tube of predetermined length and internal diameter;

a second elongated hollow tube of a length less than said predetermined length and an external diameter less than said predetermined internal diameter;

and an effectively continuous loop of flexible cord running lengthwise in series through the hollow interiors of said first and second tubes, the length of said cord being sufficient to enable opposite sides of said loop to be wrapped



around a pair of skis with said first tube tucked back between said opposite sides and spaced above said second tube to form a sling.

4,586,746

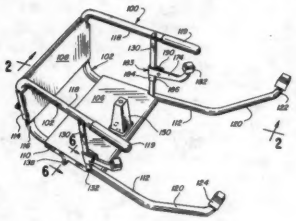
CHILD'S SEAT

Diane I. Day, Grand Rapids, and Raymond R. Schuiling, Sparta, both of Mich., assignors to Sassy, Inc., Northfield, Ill.

Filed Mar. 13, 1985, Ser. No. 711,290

Int. Cl.[4] A47B *39/00*

U.S. Cl. 297—174 **12 Claims**



1. A child's table seat adapted to be supported on a table, said table seat having a spaced pair of generally U-shaped, vertically oriented support members in spaced relation to each other, each said generally U-shaped support member having an upper leg portion having a free forward end, a lower leg portion generally parallel to said upper leg portion having a free forward end, and an upwardly extending base section connecting said upper leg portion to said lower leg portion, and a strut extending between, and attached to, a said upper leg portion and a said lower leg portion,

seating means secured to said lower leg portions adjacent said base sections and secured to said base sections,

the free end of said upper leg portion being adapted to engage the upper surface of a table and the free end of said lower leg portion extending forwardly beyond said upper leg portion and upwardly, and being adapted to engage the lower surface of a table,

lock means slidably mounted on said strut for movement toward and away from said upper leg portion and for engaging the lower surface of a table rearwardly of the free end of said lower leg portion, said lock means comprising releasable means for resisting movement of said lock means away from said upper leg portion thereby firmly to secure a said child's table seat to a table.

4,586,747

UTILITY BOOSTER CHAIR

Beverly W. Taylor, Gasconade County, Mo., assignor to Handi-Pac, Inc., Hermann, Mo.

Filed Aug. 22, 1985, Ser. No. 768,130
Int. Cl.[4] A47D *1/10*
U.S. Cl. 297—250 2 Claims

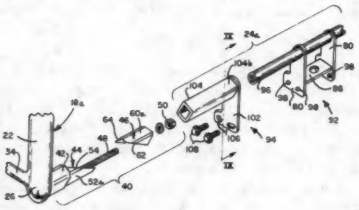
1. A utility chair comprising: a back means; a pair of spaced opposed arm members extending substantially perpendicular from said back means; said arm members having opposed longitudinally extending slots disposed therein to slope slightly downward from the horizontal toward said back means; a platform sized to extend between said arm members, said platform having opposed longitudinally extending side bars integral therewith sized to longitudinally nest in slidable reaction with said opposed slots of said arm members whereby said platform can be slidably mounted between said arm members in a slightly sloping downward fashion toward said back means, the longitudinal axes of said side bars being spaced a different distance from a plane determining one face of said platform than from a plane determining the other face of said platform to permit positioning of said platform at different height elevations when said platform is turned over; said platform having at least one face ribbed to enhance support strength and traction; said back means, arm members and platform being formed from a molded plastic material hollowed to reduce chair weight and contoured in the shape of an animal; and spaced spring urged detents and detent receiving apertures disposed between said side bars of said platform and said arm members to permit locking of said platform in several elective positions whereby said platform can be used as a seat or serving table.

4,586,748

ADJUSTABLE CHAIR IRON

Douglas W. Dingler; James F. Gadsbey, and Philip E. Crossman, all of Grand Rapids, Mich., assignors to Stow & Davis Furniture Company, Grand Rapids, Mich.

Filed Jun. 1, 1983, Ser. No. 500,250
Int. Cl.[4] A47C *7/54*
U.S. Cl. 297—300 11 Claims



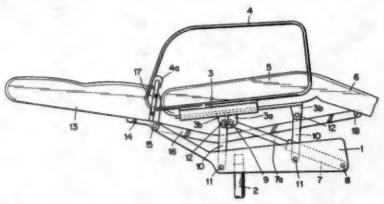
2. A chair control comprising:
means for supporting a chair seat; and
arm support means for supporting left and right chair arms on opposite sides of the chair seat, said arm support means including pivotal mounting means for pivotally mounting at least one of the chair arms with respect to said chair seat support means for movement in a generally vertical plane, said pivotal mounting means including an axle member and an arm support member to support the one chair arm, said arm support member being pivotally supported by said axle member, said arm support member including a slide tube slidingly received over said axle member, said arm support means further including releasable locking means for releasably locking said pivotal mounting means in a desired pivotal position, said releasable locking means including a first plate supported in fixed relation to said axle member, a second plate supported in fixed relation to said slide tube, said plates being in generally overlying sliding relation to each other, and means for releasably securing said overlying plates together, whereby the one chair arm can be readily aligned with respect to said chair seat support means.

4,586,749

BARBER/BEAUTY CHAIR

Masatoshi Nakatani, Osaka, Japan, assignor to Takara Company, New York, Inc., New York, N.Y.

Filed Aug. 5, 1983, Ser. No. 520,825
Int. Cl.[4] A47C *1/02*
U.S. Cl. 297—330 10 Claims



1. A beauty/barber chair with movable seatback seat and footrest, providing comfort for a human body in all chair's positions comprising:
(a) seat base means;
(b) seat plate means;
(c) seat linkage means connecting said seat plate means to said seat base means and so as to move said seat plate means between a first position with respect to said seat base means and a second position with respect to said seat base means;
(d) seat means carried by said seat plate means and movable therewith between said first position and said second position;
(e) said seat means including a footrest;
(f) seat back means pivotally connected to said seat base means and pivotably connected to said seat plate means and movable thereby so that movement of said seat means between said first position and said second position moves said seat back means between a first seat back position and a second seat back position;
(g) footrest linkage means connected to said seat back means and to said footrest to move said footrest between a first footrest position and a second footrest position upon movement of said seat back means moving between said first seat back position and said second seat back position; and
(h) hydraulic means carried by said seat base means and pivotally connected to said seat plate means and having plunger means extendable to move said seat plate means, said seat linkage means, said seat means, said seat back means and said footrest from said first positions thereof to said second positions thereof;
(i) said plunger means being retractable to move said seat plate means, said seat linkage means, said seat means, said

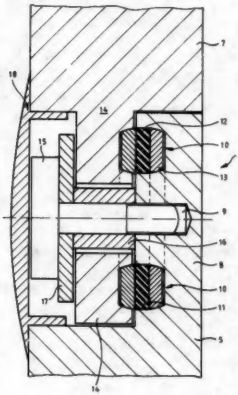
seat back means and said footrest means from said second positions thereof to said first positions thereof.

4,586,750

PASSENGER SEAT WITH ARMRESTS

Ignaz Vogel, Karlsruhe, Fed. Rep. of Germany, assignor to Ignaz Vogel GmbH & Co. KG, Karlsruhe, Fed. Rep. of Germany

Filed Jun. 4, 1984, Ser. No. 617,019
Int. Cl.[4] A47C *7/54*
U.S. Cl. 297—417 **4 Claims**



1. A passenger seat comprising seating and backrest sections, armrest support means associated with said seating and backrest sections, and an armrest pivotally supported on said armrest support means about a pivot axis, said armrest and armrest support means having circular grooves formed therein radially spaced from, and concentric with, the pivot axis of said armrest and disposed opposite one another and shaped so as to form together an annular cavity with wedge-shaped axial ends, a bearing ring comprising an elastomeric material disposed in said annular cavity between said armrest support means and said armrest, said bearing ring having conical side sections corresponding to a wedge-shaped annular cavity, and a bolt extending through an opening in one, and threaded into the other, of said armrest and said armrest support means for axially compressing said armrest and armrest support means into firm engagement with the elastomeric bearing ring therebetween, the opening in said one of said armrest and armrest support means being substantially larger in diameter than said bolt so as to provide, between said bolt and the walls defining said opening, a clearance which is sufficient to prevent contact between said walls and said bolt, thereby to prevent rattling of said armrest.

4,586,751

METHOD OF ASSEMBLING RATTAN FURNITURE

John C. McGuire, San Francisco, Calif., assignor to The McGuire Company of San Francisco, San Francisco, Calif.

Filed Nov. 13, 1984, Ser. No. 670,953
Int. Cl.[4] A47C *7/00*
U.S. Cl. 297—445 **11 Claims**

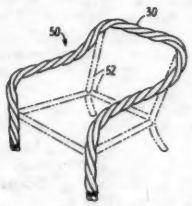
1. A method of fabricating a larger diameter piece of rattan from smaller diameter rattan segments comprising the steps of:

heating a plurality of smaller diameter rattan segments until each piece is deformable;

twisting the rattan segments in a manner to define a composite helical piece having a larger effective diameter than the individual segments; and

cooling the larger diameter piece such that a rigid member is produced suitable for constructing furniture.

9. Improved furniture having elements formed from rattan, wherein the improvement comprises:



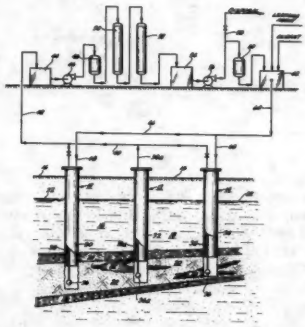
a composite rattan piece having an effective diameter greater than one and one-half inches, said composite piece being formed from a plurality of rattan segments, each having a diameter of less than one inch, with said rattan segments being twisted into a composite helical piece for added strength.

4,586,752

SOLUTION MINING PROCESS

William E. Showalter, Seal Beach, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 894,936, Apr. 10, 1978, Pat. No. 4,358,157, and Ser. No. 903,257, May 5, 1978, Pat. No. 4,358,158, each is a continuation-in-part of Ser. No. 767,788, Feb. 11, 1977, Pat. No. 4,105,253. This application Feb. 26, 1979, Ser. No. 14,936
The portion of the term of this patent subsequent to Aug. 8, 1992, has been disclaimed.
Int. Cl.[4] E21B *43/28, 43/30*
U.S. Cl. 299—4 **25 Claims**



1. A method for the solution mining of mineral values from a mineral deposit contained in a subterranean formation, comprising the steps of:

(a) providing a first plurality of wells penetrating said formation and adapted for fluid communication between the earth surface and a first participating volume of said formation, said first volume containing at least a portion of said mineral deposit;

(b) during a first injection-and-production phase of said method, (1) injecting a dilute carbonic acid leaching solution through at least one of said first plurality of wells into said first volume to therein solubilize said mineral values and thereby from a pregnant liquor, and (2) recovering said pregnant liquor from said first volume through at least another of said first plurality of wells;

(c) subsequently during a first production-only phase of said method, (1) suspending the injection of said leaching solution into said first volume, and (2) recovering additional pregnant liquor from said first volume through at least one of said first plurality of wells;

(d) thereafter during a second injection-and-production phase of said method, (1) injecting said leaching solution through at least one of said first plurality of wells into said first volume, and (2) recovering said pregnant liquor from said first volume through at least another of said first plurality of wells; and

(e) separating said mineral values from the pregnant liquor recovered during steps (b), (c) and (d) to thereby form a barren liquor.

24. An improved process for the solution mining of a mineral from a subterranean formation containing same in which an injection well and a production well are drilled and completed within said formation, leach solution and an oxidant are injected through said injection well into said formation to dissolve said mineral, and said dissolved mineral is recovered via said production well, wherein the improvement comprises employing as said leach solution a dilute carbonic acid solution and ceasing the injection of said leach solution while continuing production to alter the flow path of said leach solution in said formation between said injection and production wells and subsequently injecting said leach solution.

4,586,753

TRANSFER STATION FROM A LONGWALL CHAIN CONVEYOR TO A DRIFT CHAIN CONVEYOR

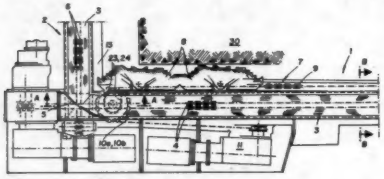
Ernst Braun, and Gert Braun, both of Essen-Heisingen, Fed. Rep. of Germany, assignors to Halbach & Braun, Fed. Rep. of Germany

Filed Mar. 19, 1984, Ser. No. 590,716

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1983, 3309999

Int. Cl.[4] **E21C** *35/12, 35/20;* **B65G** *15/24*

U.S. Cl. 299—43 **6 Claims**



1. A transfer station from a longwall chain conveyor to a drift chain conveyor wherein the longwall and drift chain conveyors both include upper chain belt sections and trough bottoms, and lower chain belt sections and trough bottoms, the longwall chain conveyor having a working side for facing the longwall of a mine, and a waste side for facing away from the longwall of a mine, comprising:

said upper and lower chain belt sections and trough bottoms for said longwall and drift chain conveyors crossing each other in a vertically alternating manner with the upper chain belt section and trough bottom of said longwall conveyor being disposed above the upper chain belt section and trough bottom of said drift conveyor;

a plane guide connected to said working side of said longwall conveyor for guiding a coal plane having upper and lower plane chain sections, said plane guide also guiding said upper and lower plane chain sections;

upper and lower guide wheels rotatably mounted to said longwall conveyor at a location adjacent said drift conveyor, said upper and lower guide wheels being vertically spaced from each other by a selected vertical distance to define a passage, said lower chain belt section of said longwall conveyor disposed for movement in said passage, the upper and lower coal plane chain sections being engageable around said upper and lower guide wheels respectively for guiding the plane chain sections to a drive unit on said waste side of said longwall conveyor; and

passage means between said upper and lower trough bottoms of said longwall conveyor defining an extension of said passage between said upper and lower guide wheels for receiving a full length of said lower chain belt section of said longwall conveyor;

where a coal plane being pulled by the coal plane chain sections is movable up to a location adjacent said drift conveyor for depositing coal won by the plane directly on said drift conveyor.

4,586,754

LOAD COMPENSATING VALVE WITH CHECK VALVE

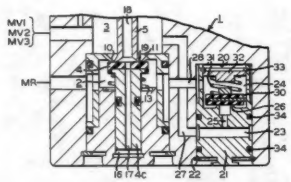
Yoshihiro Kitagawa, Kyoto, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Jul. 23, 1984, Ser. No. 633,552

Claims priority, application Japan, Jul. 28, 1983, 58-118305[U]

Int. Cl.[4] **B60T** *8/18*

U.S. Cl. 303—22 R **2 Claims**



1. A vehicle load compensating valve comprising, a balance piston, one side of said balance piston responsive to a modulating force based on control pressure corresponding to the load of the vehicle, an output chamber formed on the other side of said balance piston, a supply chamber connected to a source of fluid pressure, a supply valve seat located in said supply chamber, a supply valve mounted in said supply chamber which opens and closes a supply passage disposed between said output chamber and said supply chamber, an exhaust valve carried to said balance piston, an exhaust valve seat which is opened by said exhaust valve to vent said output chamber, and when said supply valve is seated on said supply valve seat and said exhaust valve is seated on said supply valve the fluid pressure forces are balanced, and a check valve is disposed in parallel with said supply valve to cause said output chamber to be exhausted when said supply chamber is exhausted, said check valve includes a mounting body inserted and retained in a mounting hole to form a first and second chamber which are interconnected by a central passageway in which a check valve seat is formed around the upper end of said passageway and said check valve is situated in said second chamber and is spring-biased against said check valve seat to normally close off communication between said first and second chambers and when the fluid pressure in said supply chamber is vented to atmosphere a differential pressure occurs between said first and second chambers to overcome the spring-biasing to unseat said check valve to allow communication between said first and second chambers.

4,586,755

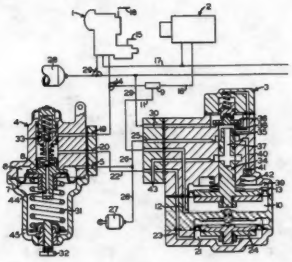
RAILWAY BRAKE CONTROL SYSTEM ARRANGED TO LIMIT MAXIMUM BRAKE PRESSURE DURING COMBINED INDEPENDENT AND AUTOMATIC BRAKE OPERATION

Robert J. Worbois, North Huntingdon, Pa., assignor to American Standard Inc., Wilmerding, Pa.

Filed Sep. 4, 1984, Ser. No. 647,091

Int. Cl.[4] B60T *8/00, 10/00, 15/18*

U.S. Cl. 303—28 **7 Claims**



1. A railway vehicle brake control system comprising:

(a) means for providing a first brake control pressure;

(b) means for providing a second brake control pressure;

(c) actuator means operative in response to the supply of fluid brake pressure thereto for applying the vehicle brakes;

(d) a relay valve having a first control chamber to which said first brake control pressure is connected, and a first control piston operative in said first control chamber in response to said first brake control pressure acting on one side thereof, and a second control chamber to which said second brake control pressure is connected, and a second control piston operative in said second control chamber in response to said second brake control pressure acting on a side corresponding to said one side thereof, and valve means operated by movement of either one of said first and second control pistons in a first direction for establishing said fluid brake pressure at said actuator means in accordance with the combined force of said first and second brake control pressures acting on said first and second control pistons; and

(e) regulating valve means for connecting one of said first and second brake control pressures to said one of said first and second control chambers and for exhausting said one of said first and second brake control pressures in response to said fluid brake pressure exceeding a predetermined value to thereby limit the maximum attainable fluid brake pressure established at said actuator means.

4,586,756

BRAKE CONTROL VALVE SYSTEM FOR RAIL VEHICLE AIR BRAKE

Joseph Hintner, Türkheim, Fed. Rep. of Germany, assignor to Knorr-Bremse GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 20, 1984, Ser. No. 632,749

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1983, 3326373

Int. Cl.[4] B60T *15/32*

U.S. Cl. 303—37 **14 Claims**

1. Brake control valve system for an indirectly operating air rake for rail vehicles, comprising:

(a) a service brake unit (SP);

(b) an emergency brake unit (EP);

(c) a service brake piston (4) forming part of said service brake unit (SP) and having first and second piston chambers (5, 6) located on opposite sides of said service brake piston (4), the first (5) of said chambers being connected to a brake line, and the second (6) of said chambers being connected to an auxiliary air container (2);

(d) an emergency brake piston (7) forming part of said emergency brake unit (EP) for controlling emergency braking, and having first and second piston chambers (8, 9) located on opposite sides of said emergency brake piston (7), the first (8) of said piston chambers being connected to said brake line, and the second (9) of said piston chambers being connected to a control chamber (10) and being switched to said brake line via a filling nozzle (11), said second piston chamber (9) having a volume several times as great as the volume of said first piston chamber (8);

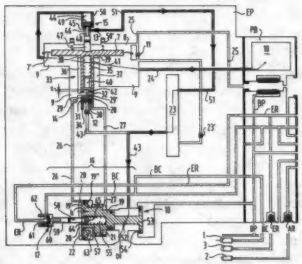
(e) a high pressure/exhaust valve system (16) comprising a control piston (19) for (i) controlling a high pressure valve (17) which connects an emergency air container (3) to a brake cylinder (1) during emergency braking, and (ii) for controlling a brake line emergency exhaust valve (18) which switches said brake line to a vent of large cross-section during emergency braking;

(f) a first channel (26) continuously connecting a first control piston chamber (20) on one side of said control piston (19) to said control chamber (10);

(g) a second channel (27) connecting a second control piston chamber (21) on the other side of said control piston (19) to a valve chamber (28);

(h) a control chamber connecting/exhaust valve system (14) surrounding said valve chamber (28) and comprising

(i) coaxial first and second valve seats (29, 30) forming



part of said valve chamber (28) and a common valve closure element (31) within said valve chamber for forming a control chamber connecting valve (29, 31) from said first valve seat (29) at the end of a third channel (29′ and said valve closure element (31), said third channel (29′) comprising a bore connecting said second piston chamber (9) to said valve chamber (28) through said first valve seat (29), and

(ii) a control chamber exhaust valve (30, 31) from said second valve seat (30) at the end of a fourth channel (43) and said valve closure element (31) with a control chamber exhaust nozzle (12) switched into said fourth channel;

(i) a first mechanical coupling device (33) between said valve closure element (31) and said emergency brake piston (7);

(j) a pulsating brake accelerator (23) operating at every stage of service braking and connected to said control chamber (10) by a brake accelerator inlet nozzle (13) within a fifth channel (51);

(k) a brake accelerator inlet valve device (15) between said control chamber (10) and said brake accelerator inlet nozzle (13);

(l) a second mechanical coupling device (48, 47) between said brake accelerator inlet valve device (15) and a first dead lift device switched into said first coupling device (33) for assuring that said brake accelerator inlet valve device (15) is switched to open position by said emer-

gency brake piston before said control chamber exhaust valve (30, 31) and to closed position after said valve;

(m) the first dead lift device having a push rod (32) which reaches through said bore (29') and said first valve seat (29), said push rod being supported against said valve closure element (31), which is biased by spring means (34) into opening direction of said control chamber exhaust valve (30, 31).

4,586,757

TRACK SHOE FOR TREADED VEHICLES

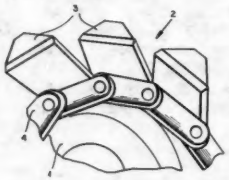
Oskar Bloechlinger, Altdorf, Switzerland, assignor to H. Bloechlinger AG, Neuhaus, Switzerland

Continuation-in-part of Ser. No. 463,829, Feb. 4, 1983, abandoned. This application Aug. 23, 1984, Ser. No. 643,723

Claims priority, application Switzerland, Feb. 23, 1982, 1099/82

Int. Cl.[4] B62D *55/28*

U.S. Cl. 305—35 R **2 Claims**



1. In an endless tread with hingedly interconnected chain links for the support of a heavy-duty vehicle,

the combination therewith of individual track shoes respectively mounted on said chain links, each track shoe having a substantially frustopyramidal body of elastomeric material, bounded by major flanks transverse to the tread and by minor flanks paralleling the longitudinal direction of the tread, bonded onto a metallic T-profile which comprises a substantially rectangular base plate secured to the respective chain link and a rib rigid with said base plate rising from said base plate in a longitudinal direction thereof and transversely to the tread, said rib being wholly embedded in said elastomeric material and extending over a major part of said body in said longitudinal direction, at least said major flanks including a minimum angle of 30° with a perpendicular to said base plate, said base plate having longitudinal edges enveloped by said elastomeric material, said body being provided with recesses flanking said rib and accommodating countersunk mounting screws penetrating the bottoms of said recesses and said base plate, said recesses being elongated in a direction parallel to said rib, each track shoe extending transversely over the greater part of the length of the respective chain link while projecting endwise beyond the latter.

4,586,758

BEARING UNIT

Hiroshi Teramachi, 3-6-4, Kamiosaki, Sinagawa-Ku, Tokyo, Japan

Filed Mar. 15, 1985, Ser. No. 712,086

Claims priority, application Japan, Mar. 19, 1984, 59-51091

Int. Cl.[4] F16C *29/04*

U.S. Cl. 308—6 C **6 Claims**

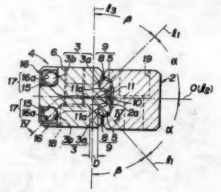
1. A bearing unit comprising in combination:

a track rail having longitudinally extending loaded grooves of a circular cross section;

a bearing body of a substantially rectangular cross section provided at its one side with first longitudinally extending loaded grooves of a circular cross section in opposed relation to said track rail grooves, and at its other side with second longitudinally extending non-loaded grooves;

a pair of end plates of substantially the same cross section as said bearing body and secured to the opposite ends of said bearing body, each end plate having at its inner surface communication grooves for connecting between the respective first loaded grooves and the corresponding second non-loaded grooves;

rolling elements recirculating through said opposed loaded grooves in said track rail and said bearing body, said communication grooves in said end plates, and said non-loaded grooves in said bearing body;



a flat retainer extending along the length of said bearing body and disposed between said bearing body and said track rail, said retainer having at its opposite sides a pair of longitudinally extending guide surfaces of a circular cross section for guiding said rolling elements rolling between the opposed loaded grooves in said bearing body and said track rail and preventing the dislocation of said rolling elements; and

covers extending along the length of said bearing body and covering the respective non-loaded grooves in said bearing body, each cover being provided on its inner side with a rectilinear ball guide surface.

4,586,759

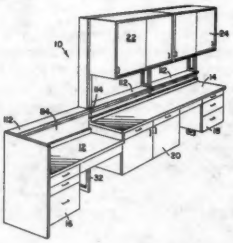
MODULAR FRAMING AND SUPPORT SYSTEM FOR LABORATORY FURNITURE

Keith A. Wrobel, Rogers, Minn., assignor to LSI Corporation of America, Inc., Minneapolis, Minn.

Filed Jun. 18, 1984, Ser. No. 621,531

Int. Cl.[4] A47B *53/00, 87/00*

U.S. Cl. 312—198 **15 Claims**



1. Apparatus for supporting horizontal work surfaces and storage units in independently adjustable fashion, comprising:

a pair of upright end frames, each end frame including a side member defining inside and outside upright channel portions;

a transverse connector extending between the side members of said end frames, each connector having opposite J-shaped ends adapted for slideable positioning along the inside channel portions of the side members of said end frames;

clamp means for adjustably securing each end of said transverse connector along the corresponding inside channel portions of said end frames;

means associated with said transverse connector for realeasably supporting a storage unit thereon; and

means associated with the outside channel portions of said end frames for adjustably supporting a work surface thereon.

4,586,760

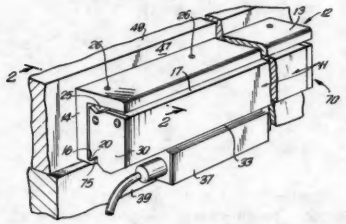
MEASURING SCALE CASING AND MOUNTING SPAR

Helmut Welker, Jamestown, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Jun. 1, 1984, Ser. No. 616,365

Int. Cl.[4] A47B *67/02*; G01B *11/04*

U.S. Cl. 312—245 **5 Claims**



1. An article comprising a casing and spar therefor, said spar comprising integral top and back walls, said back wall being provided, proximate its lower end, with a lip extending in the same direction as said top wall, the internal surface of said lip having a groove, said casing being provided with top, back and front walls, and being provided with a downward protrusion proximate the bottom of said back wall, said protrusion being sized to fit within said groove of said lip of said spar when the exterior surface of the back wall of the casing is flush against the internal surface of the back wall of said spar, said top wall of said casing being provided with a V-shaped groove and said spar being provided with screws in its top wall which can be screwed in to contact the surface of the side of the V-shaped groove which is closest to the back wall of said spar to force said protrusion into said groove in said lip and to force the exterior surface of said back wall of said casing against the internal surface of the back wall of said spar.

4,586,761

UNIT CASE HOUSING APPARATUS

Sakuzo Shimbara, Hiroshima, Japan, assignor to Nifco Inc., Yokohama, Japan

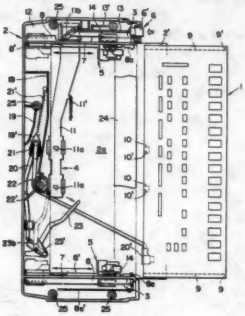
Filed Oct. 19, 1983, Ser. No. 543,553

Claims priority, application Japan, Oct. 19, 1982, 57-182054

Int. Cl.[4] A47B *88/04*

U.S. Cl. 312—319 **3 Claims**

1. A unit case housing apparatus comprising: a unit case, a unit case housing for storing the unit case in the fashion of a drawer, at least one energizing means between said housing and unit case for drawing the unit case in the direction of the front face of the housing, an engaging means on said housing for releaseably retaining the unit case in stored condition in the housing against the force of the energizing means, at least one pusher linked with the energizing means for urging the unit case from behind and pushing it out from the front face of the housing, and a release means for releasing the engaging means, said pusher comprising a damper for mitigating the force of the energizing means and causing the unit case to be pushed out of the housing slowly, said damper including a drive element positioned for engagement with a complementary member mounted in said housing during movement of the unit case outwardly from said housing, said drive element being pivotally supported adjacent said complementary member for effective disengagement with said complementary member during movement of the unit case into said housing whereby the



damper is inoperative during movement of the unit case into the housing.

4,586,762

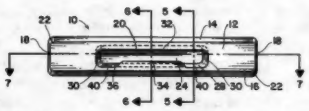
DOOR AND DRAWER FRONT HAVING A RECESSED GRASPING SURFACE

Joe H. Kennedy, Bay Minette, Ala.; A. Ronald Holland, Center Point, Pa.; Thomas Richey, Bay Minette, Ala., and James D. Alsup, Jr., Conyers, Ga., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 18, 1983, Ser. No. 514,917

Int. Cl.[4] A47B *95/02*

U.S. Cl. 312—330 R **13 Claims**



1. A readily cleanable pull for a front surface of a drawer or door, comprising:

a recessed area extending into the front surface, the recessed area having top, bottom, left, right, and rear recess surfaces;

a downwardly extending protrusion between the top recess surface and the front surface, extending between the left and right recess surfaces, the downwardly extending protrusion having a front portion coplanar with the front surface, a back portion sloping toward the rear recess surface, and a rounded apex between the front and back portions; and

an upwardly extending protrusion between the bottom recess surface and the front surface, disposed between the left and right recess surfaces but not in contact with at least one of the left and right recess surfaces thereby forming at least one cleaning access portion comprising a section of the junction between the front surface and the bottom recess surface having no upwardly extending protrusion, the upwardly extending protrusion having a front portion coplanar with the front surface, a back portion sloping toward the rear recess surface, and a rounded apex between the front and rear portions;

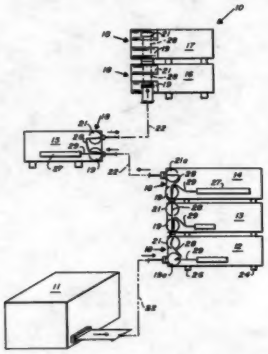
the junctions and corners between adjacent surfaces being rounded to facilitate cleaning and disinfection.

4,586,763

ROTATABLE CONNECTOR MECHANISM

David C. Paulsen, Santa Clara; William L. Calvert, Sunnyvale; Dennis R. Mitchell, San Jose, and Larry D. Gravelle, Mountain View, all of Calif., assignors to Grid Systems Corporation, Mountain View, Calif.

Filed Mar. 25, 1985, Ser. No. 715,966
Int. Cl.[4] H01R *39/02*
U.S. Cl. 339—6 R 32 Claims



1. A connector component for computer units and peripheral units, secured to housings of the units for conveniently interconnecting them with respect to power and signals and for connecting them to other units, comprising:

a frame for the component, with means for securing the frame into the housing of one of said units,

a pair of pin connectors, one male and one female,

a pair of swivel mounts, one secured to each pin connector, one at the top of the frame and one at the bottom of the frame, with means pivotally connecting each swivel mount on the frame such that the pin connector and the mount are afforded rotational movement through substantially 90 degrees from a horizontal orientation facing outwardly of the unit to a vertical orientation in position to be connected directly to an adjacent unit stacked vertically therewith and having mating pin connectors, and

internal flexible means for electrically connecting the pair of pin connectors of the connector component together and into the unit,

whereby a series of such units may be stacked together, with adjacent mating pin connectors oriented to the vertical position and connected together, and whereby units at the top and bottom of the stack may have their unmated pin connectors swiveled to the horizontal position, in which they may be connected by cables to other units.

4,586,764

ELECTRICAL SUBASSEMBLY STRUCTURE

William B. Mullen, III, Boca Raton; James E. Van Hout, and William M. Bradford, both of Ft. Lauderdale, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 7, 1985, Ser. No. 689,116
Int. Cl.[4] H05K *1/14*
U.S. Cl. 339—17 M 3 Claims

1. An electrical subassembly structure comprising:

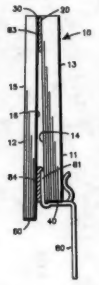
a first subassembly having a backside and a front side,

a second subassembly having a backside and a front side,

each of said subassemblies having an upper edge with a plurality of metallized portions located adjacent to said upper edge on its back side and a lower edge with a plurality of metallized portions located adjacent to said lower edge on its back side,

a plurality of clip-on leads connected to the lower edge of said first subassembly, each lead having a portion positioned against lower-edge back side metallized portions for providing both electrical and mechanical connections to said first subassembly,

the second subassembly being mounted to the first subassembly with at least some of its upper edge back side metalized portions soldered directly to said first subassemble



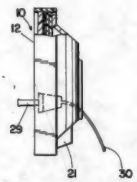
upper-edge back side metallized portions for providing electrical and mechanical inter-connection and at least some of its lower-edge back side metallized portions soldered to said clip-on lead portions for providing electrically and mechanically connection to first subassembly lower-edge back side metallized portions through said clip-on lead portions, whereby the first and second subassemblies form an inverted "v" configuration.

4,586,765

SAFETY COVER FOR AN ELECTRICAL OUTLET

Thomas E. Ban, 1156 Berwick La., South Euclid, Ohio 44121

Filed Aug. 16, 1984, Ser. No. 641,294
Int. Cl.[4] H01R *13/44*
U.S. Cl. 339—44 R 13 Claims



1. A safety cover for an electrical outlet for receiving at least one electrical plug to which an electrical cord is attached, comprising:

(a) an inner plate which is detachably mounted on an electrical outlet, the inner plate having at least one opening for exposing an outlet in which a plug is inserted, the inner plate being sized to cover the electrical outlet;

(b) means for mounting the inner plate on the electrical outlet;

(c) an outer plate for substantially covering the inner plate, the outer plate being in juxtaposed relation with the inner plate and including a housing which projects outwardly from the outer plate and adjacent inner plate and is shaped to receive and protectively cover a plug inserted in the outlet, the housing having an elongated slot which is wider than the electrical cord to which the plug is attached and narrower than the electrical plug, the slot

extending through the adjacent marginal edge of the outer plate; and

(d) means for releaseably attaching the outer plate to the inner plate in covering relation with the outlet such that, (i) the outer plate can be rotated out of interfering relation with the placement of a plug in the outlet and removal therefrom, and (ii) the outer plate can break away and separate completely from the inner plate to allow the escapement of a plug from the outlet and housing, should the plug be accidently pulled from the outlet.

4,586,766

MULTI-TERMINAL PLUG-SOCKET CONNECTION ARRANGEMENT

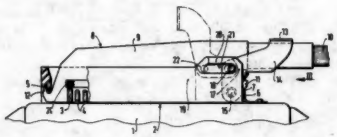
Werner Hofmeister, Mühlacker, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 3, 1984, Ser. No. 677,187

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1984, 3407725

Int. Cl.[4] H01R *13/629*

U.S. Cl. 339—45 M **14 Claims**



1. Multi-terminal plug-socket connection arrangement comprising

an elongated strip-like plug terminal element (8) and an elongated strip-like socket terminal element (2);

an interlocking, releasable interfitting hook-pivot connection (5, 12) at one end of said elements;

and an interengaging locking connection at the other end of the elements to releasably lock said elements together upon pivoting movement about the hook-pivot connection (5, 12),

a handle (13) pivotably connected to one (8) of said terminal elements (2, 8) at the side remote from the hook-pivot connection and including an angled lever (14, 17);

a guide track (21–23) formed on the other (2) of said elements (2, 8);

and interlocking means formed on said angled lever constraining movement of said angled lever and said handle to follow said guide track during relative pivoting movement of said elements,

said guide track guiding the interlocking means and hence the handle to extend in a path which increases by leverage, an engagement force exerted between said terminal elements (2, 8) upon closing pivoting movement of said terminal elements about said interfitting hook-pivot connection (5, 12).

4,586,767

INDUCTIVE COUPLER SYSTEMS

Roy J. Benjamin, Bristol; David W. Pearce, Avon, and Anthony W. Powell, Bristol, all of England, assignors to Marconi Avionics Limited, England

Filed Jun. 11, 1984, Ser. No. 619,477

Claims priority, application United Kingdom, Jun. 29, 1983, 8317659

Int. Cl.[4] H01R *13/629*

U.S. Cl. 339—45 R **6 Claims**

1. A manually-operable, under-water, inductive coupler system comprising:

(A) a first fluid-tight coupler sub-assembly including

(i) a first frame member and,

(ii) supported by said first frame member, a first magnetic half-core constituting one half of an inductive coupler;

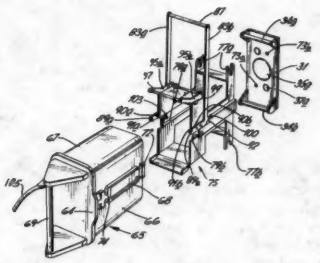
(B) a second fluid-tight coupler sub-assembly including

(i) a second frame member and,

(ii) supported by the second frame member, a second magnetic half-core constituting the other half of the inductive coupler; and

(C) an open-ended tubular guide arrangement

(i) in the wall of which means is provided defining an aperture,



(ii) said guide arrangement including means for receiving slidingly the first coupler sub-assembly through one end of the tubular arrangement, and

(iii) including means capable of co-acting with means fixed to the first coupler sub-assembly during the sliding reception movement of the first coupler sub-assembly in the guide arrangement so as to constrain the first coupler sub-assembly to take up a predetermined position with respect to the guide arrangement in which it is adapted to receive the second coupler sub-assembly via said aperture, regardless of the initial orientation of the first coupler sub-assembly with respect to the guide arrangement.

4,586,768

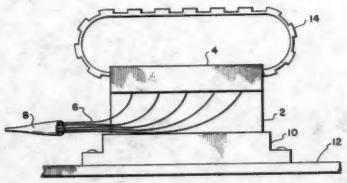
ELECTRICAL CONNECTOR PLUG WITH AN INTEGRAL EJECTOR

Bertil Eck, Warrington, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 11, 1984, Ser. No. 609,904

Int. Cl.[4] H01R *13/62*

U.S. Cl. 339—45 M **5 Claims**



1. An ejector apparatus comprising

a connector plug having a plurality of spaced grooves on a face thereof,

a cover means attached to said plug to cover said face of said plug, and

a toothed belt means retained by said cover means on said face of said plug with a plurality of the teeth of said belt means being located in corresponding ones of said grooves, said belt means comprising a belt segment having a first end and a second end arranged with said ends

butted together beneath said cover means and said belt forming an endless loop external to said cover means.

4,586,769

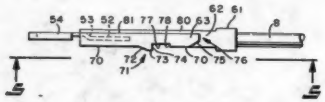
ELECTRICAL CONNECTOR TERMINATOR

John N. Tengler, Chardon, and James C. Pilny, Painesville, both of Ohio, assignors to Chabin Corporation, Chico, Calif.

Division of Ser. No. 335,656, Dec. 30, 1981, Pat. No. 4,484,792. This application Jul. 5, 1984, Ser. No. 628,155

Int. Cl.[4] H01R *14/434*

U.S. Cl. 339—59 R **37 Claims**



1. A terminator for a conductor of an electric cable, comprising contact means for electrically connecting such conductor with another device after said terminator has been axially inserted into a holder therefor, and electrically insulating means for insulating at least part of said conductor and contact means, said insulating means including a terminator body having a main support means for fitting in relatively close engagement with at least part of a holder to cooperate therewith substantially securely to position the terminator in the holder, deflectable means comprising a portion of said terminator body coupled to said main support means along an axial extent thereof in cantilever-like fashion for projection from said main support means generally in a lateral direction relative to said main support means, and locking means proximate the laterally outer end of said deflectable means for locking the terminator in such holder, said deflectable means being capable of selective deflection generally perpendicularly to an axial plane parallel to such lateral direction of projection for moving said locking means generally about an axis parallel to the axial extent of said terminator for selectively releasing said locking means from such holder.

4,586,770

ELECTRICAL RECEPTACLE

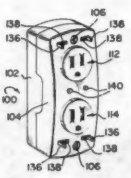
Fernand H. Poulin, 423 McDonald, Granby, Canada

Filed May 14, 1984, Ser. No. 611,014

Claims priority, application Canada, Oct. 28, 1983, 439961

Int. Cl.[4] H01R *13/635*

U.S. Cl. 339—74 R **2 Claims**



1. A duplex electrical receptacle, comprising:

a housing having a base and a cover releaseably secured to the base, said base and cover together defining an interior chamber, said base having a support surface and means for introducing electrical conductors into said chamber, said cover having a pair of spaced aperture means for admitting blade-type contacts of a plug into said chamber, and a pair of spaced slots in said cover associated with each said aperture means and extending between said chamber and an exterior surface of said housing;

a pair of blade-type electrical contact members disposed in said chamber, each said member having an elongated base adapted to be releasably secured to said support surface and electrically connected to an electrical conductor, an arm extending longitudinally from each end of said base, a flexible contact portion extending from each said arm and being longitudinally aligned with an aperture of one of said aperture means for electrically contacting a plug contact inserted through said aperture, a projection extending from a side surface of each said contact portion for interlockingly engaging an aperture in a plug contact, each said projection having having a locking surface extending substantially transversely of said side of said contact portion and a camming surface extending from said locking surface to said side at an angle thereto and toward a free end of said side, and a finger extending from said arm and outwardly of said chamber through one of said slots, said fingers being arranged to laterally displace said contact portions and release interlocking engagement between said contact portion and a plug contact upon movement of said fingers along said slots.

4,586,771

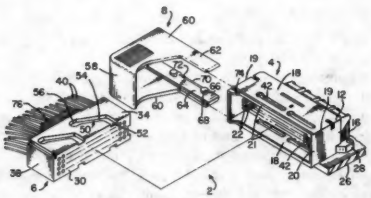
CONNECTOR ASSEMBLY HAVING CAMMING SYSTEM FOR MATING AND UNMATING

Rudolf E. Kraemer, Lautertal, and Werner Moritz, Kleinostheim, both of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 4, 1985, Ser. No. 707,625

Int. Cl.[4] H01R *13/629*

U.S. Cl. 339—75 MP **8 Claims**



1. An electrical connector assembly of the type comprising first and second connector housings, each of the housings having a plurality of electrical terminals therein and having a mating face, the mating faces of the housings being opposed to each other and being substantially against each other when the housings are coupled, each of the housings having oppositely facing sidewalls and oppositely facing endwalls, and a camming system for moving the housings towards and away from each other along a first path to mate and unmate the housings, the camming system comprising a camming side which is mounted in one of the housings and which is movable along a cam slide path which extends transversely of the first path, the connector assembly being characterized in that:

the first housing has a pair of side flanges extending therefrom on opposite sides of the mating face, the side flanges having ends which are proximate to the endwalls of the first housing and having free edges extending between the ends of the flanges which are spaced outwardly from the mating face of the first housing,

the camming slide being U-shaped and comprising a web and spaced-apart arms extending from the web, the camming slide being mounted on the flanges with the arms extending towards, and overlapping the flanges,

the second housing having cam tracks in the sidewalls thereof which extend inwardly from the mating face of the second housing, the cam tracks having intermediate portions which extend diagonally towards the rear face of the second housing, the arms having integral cam followers thereon which are received in the cam tracks,

the side flanges having slots therein which extend substantially parallel to the mating face of the first housing, the

cam follower extending through the slots, the cam follower and the slots constituting interfitting guide means for guiding the cam slide along the cam slidepath, whereby

upon positioning the second housing in opposed aligned relationship with the first housing and with the cam followers in the cam tracks, the first and second housings cam be mated to each other by moving the camming slide along the camming slide path.

4,586,772

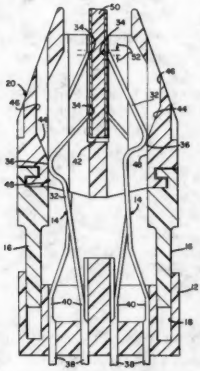
IMPROVED CARD EDGE CONNECTOR

Robert F. Cobaugh, Elizabethtown; James L. Fedder, Harrisburg, and Attalee S. Taylor, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 503,995, Jun. 13, 1983, abandoned. This application Sep. 4, 1984, Ser. No. 646,721

Int. Cl.[4] H01R *9/09*

U.S. Cl. 339—75 MP **4 Claims**



1. A zero insertion force, card edge connector, comprising:

a. a lower housing with a base having a plurality of passages located along each longitudinal side;

b. an upper housing positioned over the lower housing with means therebetween for vertically moving the upper housing relative to the lower housing, said upper housing having sidewalls with a longitudinally extending card receiving slot therebetween and transversely extending slanted wall portions spaced along the inside surfaces of the sidewalls and facing the slot; and

c. a plurality of contact elements having either a short or a long cantilever beam on which is a convex surface and, at the extreme free end, a spherical contact surface, said contact elements being positioned in the passages in the base of the lower housing with the cantilever beams extending into the upper housing with the spherical contact surfaces pointing towards the slot and with the convex surfaces engageable by the slanted wall portions so that as the upper housing moves up the spherical contact surfaces are cammed into the slot to engage traces on a circuit card which may be therein, said contact elements being placed such that a long beam is adjacent a short beam along each side of the slot and further a long beam on one side of the slot faces a short beam on the other side so that if the spherical contact surfaces are cammed into the slot without a circuit card therein, the facing spherical contact surfaces will be vertically displaced one from the other and will not touch.

4,586,773

BIPARTITE ELECTRICAL CONNECTOR HOUSING

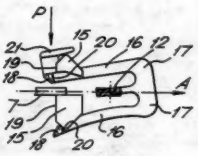
Werner Lothmann, Ascot; Leonard J. Owen, Watford, and Reginald J. Simmons, South Harrow, all of England, assignors to AMP Incorporated, Harrisburg, Pa.

PCT No. PCT/US84/00443, § 371 Date Oct. 29, 1984, § 102(e) Date Oct. 29, 1984, PCT Pub. No. WO84/03803, PCT Pub. Date Sep. 27, 1984

PCT Filed Mar. 19, 1984, Ser. No. 673,700

Int. Cl.[4] H01R *13/627*

U.S. Cl. 339—91 R **4 Claims**



1. A bipartite electrical connector housing comprising first and second housing parts each for containing at least one electrical terminal, the housing parts being capable of being mated to mate the terminals when these are contained therein, the housing parts having interengaging latching members which provide a force which assists the mating of the housing parts and which serve to secure them together in their mated condition, the latching members comprising a ramp on each of two opposite sides of the first housing part, and a resilient cantilever arm on each of two opposite sides of the second housing part, each arm carrying a projection adapted and arranged to ride over a corresponding ramp on the first housing part as the housing parts are mated, the ramps on the first housing part and the projections on the arms of the second housing part having cooperating surfaces which engage when the housing parts are fully mated, to prevent unmating of the housing parts, wherein the arms on the second housing part are ganged through a common torsion spring member, the ramp on one side of the first housing part being so shaped that deflection of the associated arm of the second housing part towards the first housing part when the housing parts have been mated, which deflection causes twisting of the torsion spring member disengages the cooperating surfaces of the ramp and the associated projection at said one side of the first housing part and is accompanied by deflection of the arm on the other side of the second housing part away from the first housing part and is accompanied by deflection of the arm on the other side of the second housing part away from the first housing part to disengage the cooperating surfaces of the ramp and the associated projection at said other side of the second housing part, to permit the housing parts to be unmated, with the projection at said one side passing under its associated ramp, and the projection at said other side passing over its associated ramp.

4,586,774

ELECTRICAL CONNECTOR FOR ARMORED CABLES

Robert G. Didier, Santa Rosa, Calif., assignor to BIW Cable Systems, Inc., Boston, Mass.

Filed Apr. 23, 1984, Ser. No. 602,767

Int. Cl.[4] H01R *13/52*

U.S. Cl. 339—94 M **8 Claims**

1. An electrical connector that establishes a reliable electrical connection between two armored cables that each carry multiple conductors, said connector being suitable for operation in an environment of combustible and corrosive fluids under high pressure, comprising:

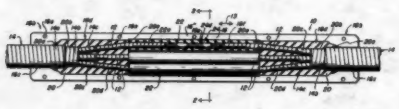
an elongated hollow housing formed of a rigid structural material that is located between and axially aligned with the cables,

a pair of insulating bodies that each surround the portion of

one of said cables that projects into said housing, said insulating bodies each having a plurality of internal passages arrayed in a side-by-side fashion and which each receive and closely surround one of said conductors,

insulating means formed of a resilient material disposed in abutting relationship between said pair of insulating bodies, said insulating means locating a stripped end of each of the conductors within a central portion of said housing with associated pairs of the conductors of each of the armored cables disposed in a generally axially aligned array,

electrical socket contacts secured within said insulating means, said socket contacts each having oppositely facing electrical connecting recesses that receive the stripped free ends of one axially aligned pair of the conductors and



have a wall intermediate said recesses that is impermeable to an axial flow of fluids therethrough,

said insulating means being in a close-abutting relationship with said conductors and said socket contacts to provide a fluid seal therebetween and maintaining said side-by-side array of said conductors,

means for permanently mechanically securing each of the stripped conductor ends in a reliable electrical connection with an associated one of said socket contacts, and

adhesive means for sealing said insulating bodies to said conductors,

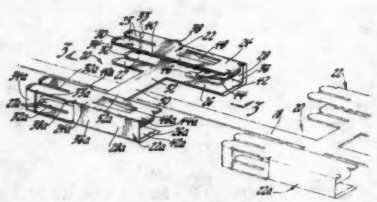
said housing having internal cavities configured to surround said pair of insulating bodies and said insulating means closely to eliminate open cavities within said housing, and said housing being non-cylindrical and having a low maximum height.

4,586,775

DUPLEX INSULATION DISPLACEMENT TERMINAL

Charles R. Nestor, Niles, and Robert G. Plyler, Vienna, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 3, 1984, Ser. No. 637,291
Int. Cl.[4] H01R *4/24*
U.S. Cl. 339—97 R **2 Claims**



1. A duplex sheet metal insulation displacement terminal comprising,

a first terminal member having a pair of spaced, elongated first plates which have longitudinal slots at one end and which are connected by a first side wall attached at respective longitudinal edges of the first plates, said first side wall having an elongated window separating the first side wall into a narrow band portion at the slotted end of the first terminal member and an elongated portion which commences rearwardly of the inner ends of the longitudinal slots to form a first channel-shaped receptacle at the opposite end,

a second terminal member having a pair of spaced, elongated second plates which are longitudinally slotted at one end and connected by a second side wall attached at respective longitudinal edges of the second plates to form a second channel-shaped receptacle at the opposite end, said second wall having an elongated window separating the second side wall into a narrow band portion at the slotted end of the first terminal member and an elongated portion which commences rearwardly of the inner ends of the longitudinal slots to form a second channel-shaped receptacle at the opposite end, and

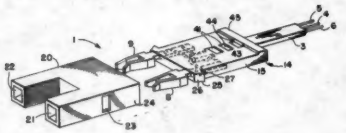
an integral lateral bus strip connecting the first and second terminal members side-by-side in a laterally spaced relationship, said integral bus strip being attached at a longitudinal edge of a first plate which is opposite the first side wall and at a longitudinal edge of a second plate which is opposite the second side wall, said integral bus strip being foreshortened in the longitudinal direction and commencing rearwardly of the inner ends of the longitudinal slots in the first and second plates to which the integral bus strip is attached.

4,586,776

CABLE TERMINATION ASSEMBLY AND WIRE STRIPPING APPARATUS AND METHOD

Frederick R. Ollis, Madison, and John N. Tengler, Chardon, both of Ohio, assignors to Associated Enterprises, Inc., Painesville, Ohio

Filed Nov. 23, 1979, Ser. No. 97,036
Int. Cl.[4] H01R *13/58*
U.S. Cl. 339—105 **38 Claims**



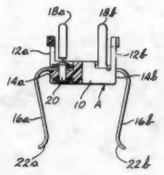
1. A cable termination assembly, comprising a cable, including plural conductors and insulation covering at least a portion of said conductors, electrical connection means for electrically connecting said conductors to another device, each of said conductors having a conductor portion exposed beyond said insulation at an end of said cable for connection with said electrical connecting means, and said insulation including an insulation portion means covering part of one of said conductors for insulating said one conductor from the exposed conductor portion of another of said conductors, and wherein the exposed conductor portion of said another conductor is positioned to cross the directional extent of said one conductor at an area of the latter that is located within said insulation portion, and wherein said insulation portion electrically separates said one and said another conductors from each other, said cable comprising a flat cable having at least three conductors extending in approximately parallel directions at spaced apart positions at least approximately in a common plane in said insulation, said electrical connecting means comprising at least two of the same, means for coupling one conductor positioned between the other two conductors to one electrical connecting means and means for coupling said other two conductors to another common electrical connecting means, and wherein said electrical connecting means includes electrical contacts extending in a direction at least approximately parallel to the major directional extent of said cable, and further comprising strain relief means molded directly to said insulation and covering junctures of said exposed conductor portions and electrical connecting means to form a substantially integral structure therewith for providing strain relief for the cable termination assembly.

4,586,777

BATTERY-SWITCH MODULE ADAPTER

Julius P. Wied, deceased, late of Hudson, Ohio (by Forrest S. Dean, administrator), assignor to Lucerne Products, Inc., Hudson, Ohio

Filed Jul. 16, 1984, Ser. No. 631,345
Int. Cl.[4] H01R *13/50*
U.S. Cl. 339—154 A 9 Claims



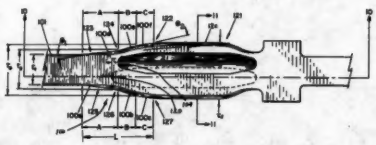
1. An integral electrical switch adapter for mechanically and electrically connecting a battery to a switch module comprising; a base having means for detachably securing the adapter to an associated electrical switch speed control module, said base also having downwardly extending from said base in a direction opposite to said detachable securing means a pair of spaced electrically conducting flexible attachment arms for grasping an associated battery therebetween and thus detachably securing the adapter to leads on the battery, said base also having a pair of elongated electrical switch bayonnet-type prong connectors extending from the base in the same direction as said detachable securing means electrically connected respectively to said pair of attachment arms for detachable electrical connection to associated leads on the module, thereby mechanically and electrically connecting the battery to the module.

4,586,778

COMPLIANT PIN

Leo Walter, Palos Verdes Peninsula, Calif.; Charles E. Ring, Minneapolis, Minn.; Bryan R. Seppala, Cottage Grove, Minn.; Patric M. Kennelly, White Bear Lake, Minn., and James P. Marnie, Lake Elmo, Minn., assignors to BMC Industries, Inc., St. Paul, Minn.

Continuation of Ser. No. 526,262, Aug. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 480,918, Apr. 7, 1983, abandoned. This application Aug. 1, 1985, Ser. No. 763,752
Int. Cl.[4] H01R *4/28;* H05K *1/04*
U.S. Cl. 339—221 R 10 Claims



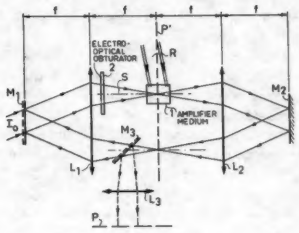
1. A smooth surfaced compliant pin for forming a low resistance electrical connection, said compliant pin having a first section, a transition zone and a compliant region, said transition zone including a radiused surface for forming an electrical connection to a receptable without damaging the conducting surface of the receptacle, said transition zone characterized by forming a transition angle of approximately 15° or less with said first section, said compliant region extending sufficiently far into said transition zone so that upon insertion of said compliant pin into the opening in a circuit board the transition zone first expands the opening in the circuit board without rupturing the opening and then said compliant region resiliently deforms to form resilient contact between the opening in the circuit board and said compliant region.

4,586,779

DEVICE FOR MEMORY-STORAGE OF A COHERENT IMAGE IN A MULTITUDE OPTICAL CAVITY

Jean-Pierre Huignard; Daniel Rak; Isabelle Ledoux, and Jean-Pierre Herriau, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed May 24, 1983, Ser. No. 497,682
Claims priority, application France, May 28, 1982, 82 09448
Int. Cl.[4] G03H *1/02;* G02B *27/46;* G11B *7/00*
U.S. Cl. 350—364 8 Claims



1. A memory-storage device for storing a coherent image in a multimode optical cavity, comprising:

at least one coherent light source that generates at least a first signal wave and at least a second reference wave, each wave having an optical path;

optical guiding means for forming a closed loop in which circulates each said signal wave, said guiding means forming a multimode optical cavity having a Fourier plane;

an amplifying interactive medium disposed in the path of each said signal wave and in the path of each said reference wave, each said signal wave interfering with a reference wave in said medium in order to create a diffraction grating therein, each signal wave receiving energy from the interfering reference wave, said amplifying interactive medium being disposed in said Fourier plane in said cavity; and

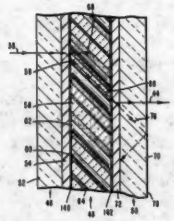
a semi-transparent beam splitter disposed in the path of each said signal wave in order to extract a part of the energy from the multimode optical cavity.

4,586,780

DIRECTIONAL DIFFUSING SCREEN WITH SUPPRESSED ZERO-ORDER LIGHT

Mao-Jin Chern, Rancho Palos Verdes; John E. Gunther, Torrance, and Ronald T. Smith, Redondo Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 30, 1982, Ser. No. 403,944
The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.
Int. Cl.[4] G02B *5/32*
U.S. Cl. 350—3.70 4 Claims



1. An optical apparatus comprising:

a first holographic optical element possessing diffractive means therein for diffracting a portion of a beam of light incident on said first holographic optical element to redirect said diffracted light so that it exits from said first holographic optical element at acute angles relative to the corresponding portions of the incident beam;

a fiber optic faceplate adjacent the first holographic optical element having light absorbing material and a plurality of substantially parallel optical firbers therein, said fibers positioned so that said diffracted light propagates therethrough and undiffracted light from said incident beam passes through said fibers and is absorbed in said light absorbing material; and

a second holographic optical element, carried on a transparent support, and positioned adjacent said fiber optic faceplate, said second holographic optical element having diffractive means therein by means of which light exiting said fiber optic faceplate and incident thereon is diffusively diffracted toward a predetermined exit pupil so that light diffracted by said second holographic optical element is substantially directed toward and illuminates said exit pupil with a selected intensity distribution.

4,586,781

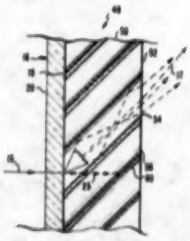
DIFFRACTION OPTICS DIFFUSING SCREEN

John E. Gunther, Torrance, and Ronald T. Smith, Redondo Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 30, 1982, Ser. No. 403,945

Int. Cl.[4] G02B 5/32

U.S. Cl. 350—3.7 **7 Claims**



1. An optical apparatus comprising:

a holographic optical element possessing diffractive means therein by means of which a portion of a beam of light incident upon any particular point on said holographic optical element from a designated direction is diffusely diffracted toward a predetermined exit pupil so that light diffracted from said incident beam by said holographic optical element is substantially directed toward and illuminates said exit pupil with a selected intensity distribution; and

a fiber optic faceplate having light absorbing material and a plurality of substantially parallel optical fibers therein, said fibers positioned with respect to said holographic optical element so that said diffracted light propagates therethrough, the angle of diffracted light from said holographic optical element being sufficiently divergent from the incident light thereon that any undiffracted incident light impinging upon said fiber optic faceplate passes through said fibers and is absorbed in said light absorbing material.

4,586,782

LASER BEAM OPTICAL SYSTEM WITH INCLINED CYLINDRICAL LENS

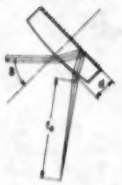
Nobuo Sakuma, 1283, Higashinaganuma, Inagi-shi, Tokyo, and Yutaka Kaneko, 6-15-305, Haramachi, Isogo-ku, Yokohama-shi, Kanagawa-ken, both of Japan

Filed Apr. 29, 1983, Ser. No. 489,935

Claims priority, application Japan, May 1, 1982, 57-73870; May 1, 1982, 57-73871

Int. Cl.[4] G02B 26/10

U.S. Cl. 350—6.5 **7 Claims**



1. In a photoscanning apparatus including a light beam source, a photodeflector, and an optical system including a cylindrical lens for placing a surface of said photodeflector and a photosensitive body in a geometrical, optically conjugated relation and providing a photodeflector light deflecting irregularity correcting function for the photodeflector, the improvement wherein said cylindrical lens has its optical axis inclined with respect to the incident beam such that its effective focal length is made shorter than its paraxial focal length by the inclination.

4,586,783

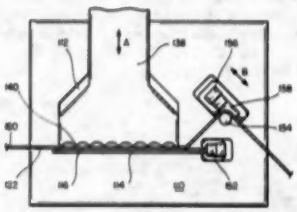
SIGNAL COUPLER FOR BUFFERED OPTICAL FIBERS

Bruce D. Campbell; Robert J. Naldoff, both of Portola Valley, and Richard E. Tylor, Fremont, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed May 23, 1983, Ser. No. 496,797

Int. Cl.[4] G02B 6/26

U.S. Cl. 350—96.15 **18 Claims**



12. A tap for a buffered optical fiber, the tap having an open position in which it does not operate on the fiber and a closed position in which it does operate on the fiber, comprising:

(i) a signal coupler for a buffered optical fiber which comprises:

a terminator body having a keyway slot therein;

a soft, transparent, polymeric rod of cross-section at least as great as the buffered fiber, the rod being disposed in the keyway slot;

rigid backing means disposed in the keyway slot; a rigid key having regularly spaced protrusions on a surface thereof inserted into the keyway slot in a vicinity of the rod to press the buffered fiber against the rod; and

compression means for urging that surface of the key having the protrusions against the fiber to force it into contact

with the polymeric rod and induce optical coupling between the fiber and the rod;

the coupler having an open position in which the compression means does not urge the key against the fiber and a closed position in which the compression means does urge the key against the fiber to induce optical coupling between the fiber and the rod;

(ii) detection means adjacent an end of the rod for detecting an optical signal which is coupled into the rod when the coupler is closed;

(iii) bending means through which the fiber passes; and

(iv) injecting means for injecting an optical signal into the bent position of the fiber when it is maintained in a bent configuration by the bending means.

4,586,784

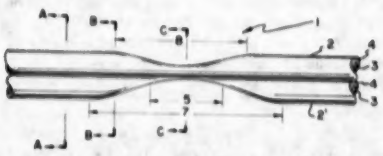
MODAL-INSENSITIVE BICONICAL TAPER COUPLERS

Yves Tremblay, Edmonton; Brian S. Kawasaki, Kanata, and Francois Bilodeau, Hull, all of Canada, assignors to Canadian Patents & Dev. Limited, Ottawa, Canada

Continuation of Ser. No. 503,287, Jun. 10, 1983, abandoned. This application Sep. 9, 1985, Ser. No. 774,851

Int. Cl.⁴ G02B 6/28

U.S. Cl. 350—96.15 **12 Claims**



1. A modal-insensitive coupler comprising a number N of optical multimode fiber lengths, each fiber length having a core of initial predetermined cross-sectional area, wherein the fiber lengths are fused and tapered together in a coupling section such that the cores of the fiber lengths have a reduced cross-sectional area in the coupling section for supporting a minimum number of modes of optical energy predetermined wavelength to obtain near complete core mode to cladding mode conversion and the ratio of the tapered core diameter to the initial core diameter of M of the fibers, where $M<N$, is smaller than the ratio of the tapered core diameter to the initial core diameter of the remaining $N-M$ fibers, and such that the fiber lengths have predetermined core cross-sectional areas to produce preselected coupling ratios.

4,586,785

SODIUM IODIDE, LIGHT PIPE

Carl F. Swinehart, University Heights, Ohio, assignor to Harshaw/Filtrol Partnership, Cleveland, Ohio

Division of Ser. No. 397,553, Jul. 12, 1982, Pat. No. 4,449,780, which is a division of Ser. No. 241,556, Mar. 9, 1981, Pat. No. 4,341,654, which is a division of Ser. No. 931,323, Aug. 7, 1978, Pat. No. 4,277,303. This application Jun. 25, 1984, Ser. No. 603,018

Int. Cl.⁴ G02B 5/14

U.S. Cl. 350—96.28 **1 Claim**

1. A sodium iodide light pipe for separating and shielding a scintillator from radioactive emission from phototubes and the like, said light pipe having more than 10 percent absorption per inch at 5.15 microns for a path length of 1 inch, and a relative pulse height RPH less than 1 percent of a thallium activated sodium iodide (NaI:Tl) scintillator of the same size and shape, for radiation from cesium 137 (Cs^{137}).

4,586,786

AREA BEAM TYPE SPLITTER

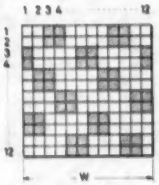
Takashi Suzuki; Susumu Matsumura, both of Yokohama, and Nozomu Kitagishi, Inagi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

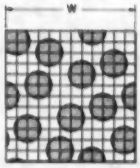
Continuation of Ser. No. 457,243, Jan. 11, 1983, abandoned. This application Apr. 8, 1985, Ser. No. 720,475

Claims priority, application Japan, Jan. 14, 1982, 57-4315

Int. Cl.⁴ G02B 27/10

U.S. Cl. 350—169 **5 Claims**





1. An area type beam splitter comprising:

a substrate having a beam splitting surface thereon, said surface being defined by a plurality of contiguous small sections disposed with no spaces therebetween, each small section including a plurality of minute reflecting surfaces with the remainder of the section being transmissive, said reflecting surfaces being randomly arranged therein, the random arrangement of minute reflecting surfaces being repeated in each of said small sections defining said beam splitting surface.

4,586,787

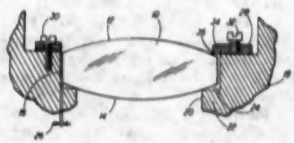
LENS ASSEMBLY

Carlo L. Fiandra, New Canaan, and Warren Deschenaux, Shelton, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 518,780, Jul. 29, 1983, abandoned. This application Sep. 27, 1985, Ser. No. 780,786

Int. Cl.⁴ G02B 7/02

U.S. Cl. 350—257 **14 Claims**



1. A lens assembly comprising, in combination:

a lens having a front face and a back face and a peripheral edge;

a lens cell having an axial bore, said lens cell having a radially inwardly extending lens seat, said lens seat having a radially extending seating surface for engaging one of said lens faces, the peripheral edge of said lens being radially spaced from the inner wall of said lens cell;

a retainer ring, means for removably, adjustably, rigidly mounting said retainer ring in said axial bore spaced a preselected axial distance from said lens seating surface substantially equal to the thickness of said lens, said retainer ring having a plurality of radially inwardly directed fingers, said fingers being disposed closely adjacent the other of said lens faces; and

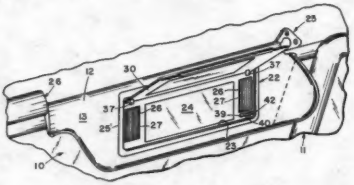
adhesive means disposed axially between said retainer ring fingers and said other lens face for tying said lens to said retainer ring after alignment of said lens whereby said lens and said retainer ring are removable from said lens cell as a single integral unit.

4,586,788

AUTOMATIC DIMMING SWITCH FOR A VEHICLE ILLUMINATED VISOR

Scott A. Hansen, Holland, Mich., assignor to Prince Corporation, Holland, Mich.

Filed Mar. 2, 1984, Ser. No. 585,526
Int. Cl.[4] G02B *26/00*
U.S. Cl. 350—283 **11 Claims**



1. An illuminated covered mirror assembly for use in a vehicle comprising:

a mirror;

support means for said mirror and including illumination means adjacent said mirror for directing illumination outwardly therefrom;

a cover mounted on said support means for continuous movement between a fully closed position over said mirror and a fully open position exposing said mirror for use;

electrical circuit means including first switch means positioned to be actuated only by said cover when moved to an open position for supplying operating power to said illumination means, said electrical circuit means further including second switch means including an element positioned to be manually moved by a user between high and low positions for controlling the intensity of illumination between high and low levels, respectively; and

means coupling said cover to said second switch means for moving said second switch means from said high position to said low position in response to movement of said cover from an open to a closed position.

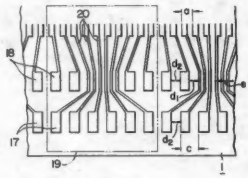
4,586,789

LIQUID CRYSTAL DISPLAY UNIT WITH PARTICULAR ELECTRODE TERMINAL GROUPINGS

Munehisa Kishimoto; Noboru Sakata; Miyoshi Kimura, all of Yokohama; Kouichi Fujiwara, Musashino, and Hidekazu Komura, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 5, 1983, Ser. No. 538,810
Claims priority, application Japan, Oct. 8, 1982, 57-176107
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—336 **5 Claims**

3. A liquid crystal display unit comprising at least a liquid crystal display element having a liquid crystal display portion and electrode terminal groups, and a drive circuit substrate for applying voltage to said liquid crystal display portion via said electrode terminal groups, said electrode terminal groups of said liquid crystal display element including at least a first electrode terminal group arranged with a first predetermined spacing and having at least one space portion in the course of the arrangement of said first electrode terminal group, said at least one space portion having a width which is larger than said first predetermined spacing, and a second electrode terminal group positioned in parallel with said first electrode terminal group and arranged with another spacing which is close to said first predetermined spacing, said second electrode terminal group being connected to wire paths collectively passed through said at least one space portion in said first electrode



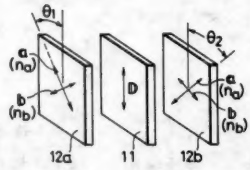
terminal group, said drive circuit substrate being further provided with a third electrode terminal group and a fourth electrode terminal group positioned in parallel with said first electrode terminal group and said second electrode terminal group of said liquid crystal display element, said second and fourth electrode terminal groups being placed near the exterior edge of said liquid crystal display element and said drive circuit substrate, respectively, and said first and third electrode terminal groups being placed in parallel inside of said second and fourth electrode terminal groups, respectively.

4,586,790

DISPLAY PANEL HAVING UNIAXIALLY-STRETCHED ORGANIC POLYMER FILM AS THE SUBSTRATE

Takao Umeda, Hitachi; Takao Miyashita, Kumagaya; Yuzuru Shimazaki, Hitachi; Tatsuo Igawa, Kitaibaraki; Ken Sasaki, and Shigeru Matsuyama, both of Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 15, 1983, Ser. No. 466,488
Claims priority, application Japan, Feb. 22, 1982, 57-26111
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—337 **7 Claims**



1. In a display panel comprised of a pair of substrates whose opposed surfaces are equipped with transparent conductive layers and at least one of which comprises an organic polymer film and a polarizer disposed adjacent to said polymer film, and of a display member interposed between said pair of substrates, the improvement wherein said organic polymer film is a uniaxially stretched polyester film selected from the group consisting of uniaxially stretched polyethylene terephthalate, uniaxially stretched polyethylene isophthalate, uniaxially stretched polyphenylene isophthalate and uniaxially stretched polybutylene terephthalate; the angle defined between the slow and fast principal axes of birefringence of said uniaxially stretched polymer film and the direction of the axis of polarization of said polarizer is within approximately ±3°.

4,586,791

OPTICAL MODULATION ELEMENT WITH SURFACE PARALLEL AND UNIDIRECTIONAL ALIGNMENT OF LC

Masato Isogai, Hitachi; Kishiro Iwasaki, Hitachiohta, and Fumio Nakano, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 6, 1983, Ser. No. 482,640
Claims priority, application Japan, Apr. 7, 1982, 57-56545
Int. Cl.[4] G02F *1/13;* C09K *19/56, 19/22*
U.S. Cl. 350—341 7 Claims

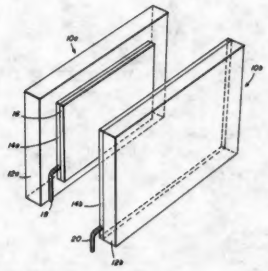
1. A liquid crystal optical modulator comprising:
two transparent substrates positioned so as to face each other;
a transparent electrode provided on the facing surface of each of said transparent substrates;
a transparent insulating/orientation control layer provided on each of the facing surfaces of said transparent electrodes, for orientating the liquid crystal molecules adjacent thereto in a substantially single predetermined direction, which single predetermined direction is substantially parallel to the surfaces of said substrates, said insulating-/orientation control layers being directionally rubbed and made of a member selected from the group consisting of polyimide films, polyamide films and polyvinyl alcohol films;
a liquid crystal layer exhibiting a ferro-electricity, sandwiched between said insulating/orientation control layers; and
means for polarizing light passing through said liquid crystal layer.

4,586,792

ELECTRONIC DISPLAY ELEMENT

Sze C. Yang, Kingston, and Richard R. Durand, Jr., West Kingston, both of R.I., assignors to Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, both of Providence, R.I.

Filed Aug. 31, 1984, Ser. No. 646,232
Int. Cl.[4] G02F *1/01*
U.S. Cl. 350—357 6 Claims



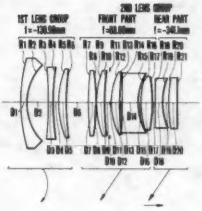
1. An electronic display element which comprises:
first and second electrodes in electrolytic communication at least one of said electrodes being transparent;
a polymer formed from monomeric aniline coated on one of said electrodes the polymer characterized in that it will display at least three distinct color changes in response to voltages applied to the electrodes which color changes are reproduceable.

4,586,793

ZOOM LENS

Tsunefumi Tanaka, and Keiji Ikemori, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1983, Ser. No. 478,890
Claims priority, application Japan, Apr. 12, 1982, 57-60815
Int. Cl.[4] G02B *9/64, 15/177*
U.S. Cl. 350—426 8 Claims



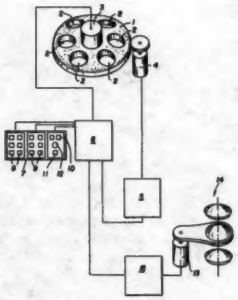
1. A zoom lens comprising:
two lens components, said two lens components being, from front to rear,
a first lens component having a negative refactive power,
a second lens component having a positive refractive power and a plurality of lens subcomponents, those lens subcomponents moving unitedly along the optical axis during zooming, wherein
zooming is performed by varying the air separation between said first lens component and said second lens component, and
focusing is performed by moving one of the plurality of said subcomponents of said second lens component.

4,586,794

MICROSCOPE WITH AN OBJECTIVE TURRET

Fritz Bierleutgeb, and Gerhard Kappl, both of Vienna, Austria, assignors to C. Reichert Optische Werke, AG, Vienna, Austria

Filed Sep. 10, 1984, Ser. No. 649,094
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1983, 3332788
Int. Cl.[4] G02B *7/16*
U.S. Cl. 350—520 8 Claims



1. A microscope turret drive comprising, a rotatable objective turret, said turret being adapted to carry a plurality of microscope objectives, said turret having a plurality of primary positions and a plurality of alternate positions, each of said plurality of primary positions being adapted to locate a respective microscope objective on the microscope optical path, each of said plurality of alternate positions being adapted to locate two adjacent objectives on opposite sides of the microscope optical path, drive means for rotating said turret

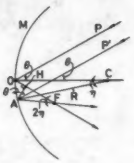
and control means for activating said drive means and stopping said drive means in one of said plurality of primary or alternative positions.

4,586,795

WAVEGUIDE FOR LASER BEAMS

Kimizo Ono; Shinya Takenaka, and Katsuyoshi Sunago, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 381,654, May 24, 1982, abandoned. This application Sep. 24, 1984, Ser. No. 654,049
Claims priority, application Japan, May 26, 1981, 56-80593
Int. Cl.[4] G02B *17/06*
U.S. Cl. 350—620 8 Claims



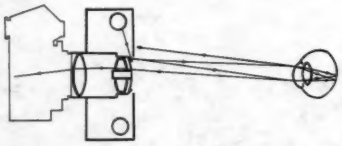
1. A waveguide for parallel light beams, comprising; a combination of at least one concave surface mirror and a convex surface mirror arranged in skew relation (Lw), said mirrors being formed such that parallel beams of light falling on said mirrors at given incident angles are reflected from one mirror to the other so that a common focus (F) is formed without an intermediate focus between said mirrors.

4,586,796

TESTING TO DETERMINE THE FIXATION AND FOCUSING OF LIVING EYES

Anthony C. B. Molteno, 9 Fairfax Street, Maori Hill, Dunedin, New Zealand

Filed Oct. 7, 1983, Ser. No. 539,825
Claims priority, application New Zealand, Oct. 8, 1982, 202116
Int. Cl.[4] A61B *3/14, 3/10*
U.S. Cl. 351—206 11 Claims



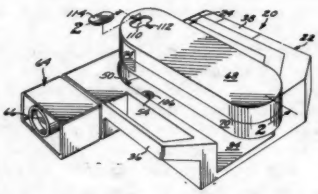
5. Apparatus for use in determining the fixation and focussing of living eyes, said apparatus comprising a camera housing, a camera objective mounted in said camera housing, means to form a circular illuminable slit around said camera objective with the inner edge of the illuminable slit providing the limiting aperature of the camera objective and also forming a sharp edge between the camera objective and any light projected through said slit, a flash light source around the camera objective to illuminate the slit, a fixation light on the optic axis of the camera objective and in the same plane as the slit visual image recording means to record light passing through said camera objective operable in association with said flash light source which illuminates said slit so that when said eyes are focussed on the fixation light, light from the slit slight source focusses on the retina of the eyes and is reflected to form a retinal image of the slit whereby if the eyes being tested do not focus correctly, light passes through the camera objective to be recorded as a brightening in the pupils of the defective eye on the visual image recording means.

4,586,797

SLIDE PROJECTOR SYSTEM

Stephen M. Sherer, 71-519 Biskra Rd., Rancho Mirage, Calif. 92270

Filed Oct. 14, 1983, Ser. No. 542,049
Int. Cl.[4] G03B *23/08*
U.S. Cl. 353—109 43 Claims



1. A slide projector assembly, comprising:

a projector housing having an open-sided and upwardly open cavity formed therein;

drive means within said projector housing and extending into said cavity at a position generally opposite the open side of said cavity and generally adjacent a projector viewing gate;

optical means within said projector housing for providing a source of light illuminating said viewing gate; and

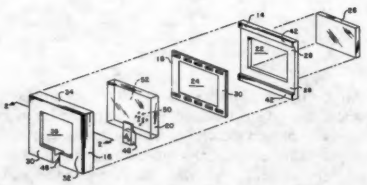
a slide cartridge for reception into said cavity, said slide cartridge including a cartridge housing enclosing an endless belt including means for carrying a plurality of slides along a generally horizontal pathway, driven means supporting said endless belt and for engagement by said drive means when said cartridge is received into said cavity, said drive means being for driving said driven means for transporting said endless belt in steps, said driven means being for indexing the slides one at a time to said viewing gate for illumination by said optical means, and an excess port formed in said cartridge housing generally over said viewing gate to permit, when said slide cartridge is received within said cavity, loading of a slide into said cartridge housing at a position directly at said viewing gate and to permit removal of a slide from within said cartridge housing when said slide to be removed is at said viewing gate.

4,586,798

PHOTOGRAPHIC SLIDE ASSEMBLY AND PROJECTOR

Robert R. Eaves, 1395 Varnum Dr., Wayne, Pa. 19087

Continuation-in-part of Ser. No. 550,191, Nov. 9, 1983, abandoned. This application Oct. 15, 1984, Ser. No. 661,114
Int. Cl.[4] G03B *21/00*
U.S. Cl. 353—120 23 Claims



1. A photographic slide assembly including: transparency means, said transparency means comprising a photographic

film having an emulsion side and an image area which includes an illusion-of-motion pattern;

an activator sheet having an illusion-of-motion pattern thereon which is operationally complementary to said motion pattern of said transparency means film, said motion pattern being printed on a first surface of said activator sheet;

means supporting said transparency means and said activator sheet so that said film and activator sheet lie in adjacent planes, said supporting means positioning said transparency means and activator sheet with their respective film emulsion side and the first surface in a facing relationship, said activator sheet being captured in said supporting means so as to be capable of limited motion in its support plane, said supporting means cooperating with said transparency means and activator sheet to define an integral slide assembly of generally rectangular shape, said supporting means including:

first plate means, said first plate means being at least partly transparent;

second plate means, said second plate means being at least partly transparent; and

spacer means disposed between said first and second plate means;

means for imparting substantially linear motion to said activator sheet whereby said activator sheet may be caused to more relative to said transparency means to thereby create an illusion-of-motion when said integral slide assembly is positioned within the slide receiving area of a photographic slide projector, said motion imparting means being affixed to said activator sheet and at least in part extending outwardly from said supporting means; and

means for resiliently biasing said activator sheet to a first position from which it is periodically moved by said motion imparting means, said biasing means contacting said activator sheet at least at two spacially displaced points, said biasing means causing return of said activator sheet to said first position after the displacement thereof from said first position by said motion imparting means.

4,586,799

EXPOSURE APPARATUS

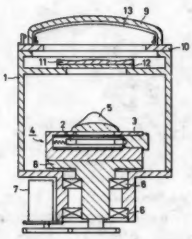
Nobuyasu Hayashi, Chiba, and Takashi Fujimura, Mobara, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 27, 1985, Ser. No. 706,183

Claims priority, application Japan, Feb. 27, 1984, 59-34226

Int. Cl.[4] G03B *41/00*; G02B *13/18*

U.S. Cl. 354—1 **3 Claims**



1. In an exposure apparatus of the type in which a light source, formed by fixing a light emitting tube, housed under a cover except a partial opening, inside a lamp housing filled with cooling water, is disposed in such a fashion that said opening faces an exposed surface via a tranparent faceplate of said lamp housing and said light source is rotatable with the center axis of said exposed surface, perpendicular thereto, being the axis of rotation, the improvement wherein said faceplate of said lamp housing consists of a saddle-shaped lens having a concave surface in the radial direction of said light emitting tube and a convex surface in the axial direction.

4,586,800

DATA READING DEVICE FOR AUTOMATICALLY READING FILM CARTRIDGE DATA

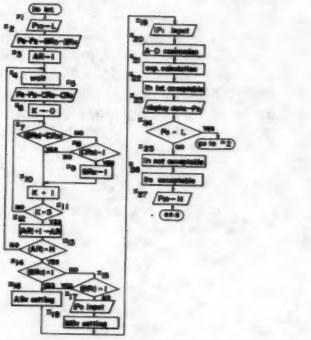
Shinji Tominaga, Osaka; Masaaki Nakai, Kawachinagano; Norihiro Inoue, Nara; Akihiko Fujino, Sakai; Manabu Inoue, Kobe, and Nobuyuki Taniguchi, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 5, 1985, Ser. No. 720,296

Claims priority, application Japan, Apr. 6, 1984, 59-69833

Int. Cl.[4] G03B *7/24*

U.S. Cl. 354—21 **19 Claims**



1. A data reading device for a camera which is adapted to be loaded with a film cartridge having a code pattern whose code regions are selectively conductive and nonconductive with a common region thereof in accordance with the film data contained in said film cartridge, said data reading device comprising:

(a) means for determining whether predetermined regions of said code regions are conductive or nonconductive with said common region;

(b) means for reading the determination result to produce data in accordance therewith;

(c) means for causing said reading means to repeat the reading operation for a number of times at different moments; and

(d) means for receiving the plurality of data produced by said reading means to produce data being accurate with high probability based thereon.

4,586,801

MODE CHANGING MECHANISM FOR PRE-WINDING TYPE PHOTOGRAPHIC CAMERA

Tetuo Nishizawa; Seiji Asano; Minoru Ishiguro; Masanoshin Komori; Takashi Tobioka; Toshio Yoshida, all of Ohmiya, and Hiroshi Hara, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Tokyo, Japan

Filed Oct. 9, 1984, Ser. No. 658,480

Claims priority, application Japan, Oct. 12, 1983, 58-190338; Oct. 12, 1983, 58-190339

Int. Cl.[4] G03B *1/18*

U.S. Cl. 354—173.1 **5 Claims**

1. A pre-winding type photographic camera capable of receiving a film magazine containing film, comprising:

a backlid movable between an open position and a closed position;

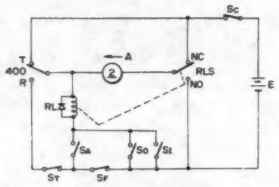
a take-up spool;

motor means for moving the film from the film magazine to the take-up spool during a pre-winding mode and for

moving the film from the take-up spool to the film magazine during a photographing mode;

mode changing means for changing the mode of operation of the camera between the pre-winding mode and the photographing mode; the mode changing means including a mode changing member movable between a pre-winding mode position and a photographing mode position, retainer means for selectively engaging the mode changing member and holding the mode changing member in the pre-winding mode position, means for moving the mode changing member into the photographing mode position when the mode changing member is disengaged from the retainer means, means for moving the mode changing member into the pre-winding mode position when the backlid is moved to the open position, and detecting means for detecting when the pre-winding mode is complete and disengaging the retainer means from the mode changing member;

control circuit means for controlling the motor means; the control circuit means including a mode changing switch responsive to the mode changing member, the mode changing switch having a pre-winding mode connection and a photographing mode connection, the pre-winding mode connection being made when the mode changing



member is in the pre-winding mode position, the photographing mode connection being made when the mode changing member is in the photographic mode position; the control circuit means also including one-frame switch means for controlling the motor to move the film from the take-up spool to the film magazine by one frame each time the film is exposed, the one-frame switch means being operative when the photographing mode connection is made and being inoperative when the pre-winding mode connection is made; the control circuit means further including magazine switch means having a first position and a second position, the magazine switch means being responsive to insertion and removal of the film magazine and responsive to movement of the backlid, the magazine switch means being placed in the first position when the film magazine is inserted into the camera and when the film magazine is removed from the camera, the magazine switch means being placed in the second position when the backlid is moved to the open position, the first position of the magazine switch means permitting current to flow through the motor means, the second position of the magazine switch means preventing current from flowing through the motor means, the magazine switch means being electrically in series with the motor means when the pre-winding mode connection is made.

4,586,802

CAMERA CAPABLE OF SPECIAL EFFECTS PHOTOGRAPHY

Akihiko Nagano, and Kiyoshi Iizuka, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1985, Ser. No. 723,664

Claims priority, application Japan, Apr. 16, 1984, 59-76287

Int. Cl.[4] G03B *11/00, 13/02*

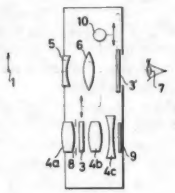
U.S. Cl. 354—219 **9 Claims**

1. A camera comprising:

(a) a photographic optical system having a photographic optical path and arranged to form an image of an object on an image receiver;

(b) a finder optical system having an observation optical path to observe an object;

(c) a special effect filter arranged in the photographic optical



path to bring about a special portrayal effect on the object image; and

(d) an auxiliary filter a different characteristic to that of said special effect filter and arranged in the observation optical path to bring about a special effect on an object image to be observed.

4,586,803

DEVELOPING DRUM

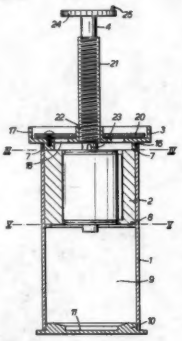
Brian F. Moss, Chelford; Ian B. Pilkington, Prestbury, and Richard J. Brent, Bramhall, all of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Nov. 20, 1984, Ser. No. 673,275

Claims priority, application United Kingdom, Nov. 23, 1983, 8331265; Oct. 26, 1984, 8427101

Int. Cl.[4] G03D *13/06*

U.S. Cl. 354—313 **18 Claims**



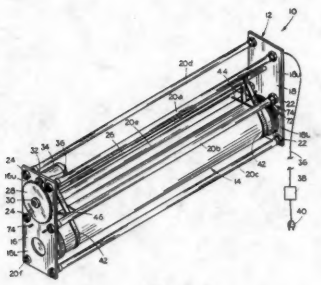
1. An apparatus for the processing of a film contained in a cassette, the cassette being of the kind comprising a substantially cylindrical body formed with protruding light-tight, longitudinally extending film exit slot means, end caps to said body and a spool held between said end caps and having the film wound thereon, said apparatus comprising a light-tight enclosure, means therein shaped to receive and retain said cassette body and having a space sufficiently large to receive from said cassette the spool with the film wound thereon, and a plunger adapted for engaging the spool of said cassette and being movable to force one of said end caps off said cassette body and to move said spool and the film wound thereon out of said cassette body and into said space, said space being adapted for containing liquid for processing the film.

4,586,804

PHOTOGRAPHIC PAPER HANDLING DEVICE AND METHOD

Gary H. Gerding, 4623 N. 93rd St., Omaha, Nebr. 68134

Filed Oct. 17, 1984, Ser. No. 661,964
Int. Cl.⁴ G03D *3/00*
U.S. Cl. 354—322 **17 Claims**



1. A photographic paper handling device comprising

a frame comprising a pair of opposite end walls having upper and lower portions, and brace means connected to and extended between said end walls for supporting said end walls in upright generally parallel spaced-apart relation,

a drive shaft rotatably supported on the upper portions of said end walls,

a generally cylindrical photographic paper carrier of a length adapted for placement lengthwise between said end walls,

said carrier comprising a light tight tube equipped with light tight end caps on the opposite ends thereof,

positioning means on said end walls for rotatably positioning said carrier between lower portions of said end walls, and

drive means disengageably connecting the carrier to said drive shaft for rotation of the carrier in response to rotation of the drive shaft,

said carrier being adapted to receive within it exposed photographic paper to be developed, and

said carrier having ends which are open for the flow of developing chemicals therethrough whereby the handling device with the loaded carrier may be sequentially placed in successive tanks of chemicals to the extent of submersion of said carrier for developing the paper in the carrier.

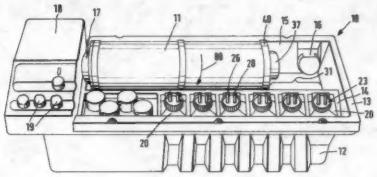
4,586,805

DEVICE FOR DEVELOPING OF PHOTO MATERIAL

Johannes J. Bockemühl-Simon; Rainer Bernhardt, and Walter Kremer, all of Bergneustadt, Fed. Rep. of Germany, assignors to JOBO Labortechnik GmbH & Co. KG, Gummersbach, Fed. Rep. of Germany

PCT No. PCT/EP81/00080, § 371 Date Aug. 3, 1981, § 102(e) Date Aug. 3, 1981
PCT Filed Jun. 23, 1981, Ser. No. 290,807
Claims priority, application Fed. Rep. of Germany, Jun. 26, 1980, 3023953; Sep. 13, 1980, 3034673
Int. Cl.⁴ G03D *3/02, 13/04*
U.S. Cl. 354—323 **18 Claims**

1. A device for developing of a photo material, comprising a treatment container; a gas supply source; a plurality of closed supply containers for different treatment liquids, each of said supply containers being provided with a gas line which is connectable with said gas supply source and thereby builds up a gas pressure within a respective one of said supply containers, each of said supply containers being also provided with a feed pipe for a treatment liquid which is driven from a respective one of said supply containers by the gas pressure which feeds a desired quantity of the treatment liquid to said treatment container; means forming a plurality of paths for the different treatment liquids extending from a respective one of said supply containers to said treatment container, said means including a collection pipe through which the desired quantity of the treatment liquid is fed by the gas pressure from respective one of said supply containers to said treatment container, said means also including a plurality of feed pipes connected with said supply containers; a distribution valve having a plurality of inlets and outlets and a step motor which switches said distribution valve in accordance with a control program so as to provide connections to the respective inlets and outlets of said valve and to thereby feed a respective treatment liquid from a respective one of said supply containers into said treatment container during respective operating phases in accor-



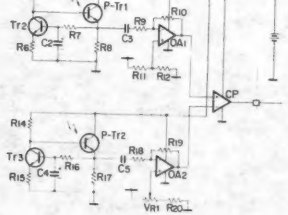
dance with the control programs, said flow paths for the different treatment liquids being formed so that they are free of valves and have a defined flow resistance, said distribution valve being arranged so that it is loaded with gas only through one of said inlets for said gas supply source as well as through said outlets for said gas lines of said supply containers, and at the end of one of said operating phases for a reverse switching of said distribution valve to a different one of said outlets the previously controlled one of said outlets is relieved from the gas pressure; and a sensor provided in said collection line and reacting to a flow of the treatment liquid, and a timer activated by said sensor at the beginning of each of said operating phases and after an adjusted time period switching said step motor of said distributor valve in accordance with the control program.

4,586,806

CAMERA RANGE FINDER

Seiichi Isoguchi, Japan, and Hiroshi Takahashi, both of Hachioji, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1984, Ser. No. 579,019
Claims priority, application Japan, Feb. 14, 1983, 58-23179
Int. Cl.⁴ G03B *3/00*
U.S. Cl. 354—403 **4 Claims**



1. A camera, comprising:

a light-emitting means for emitting light to an object;

a plurality of phototransistors which generate electric signals corresponding to the light reflected from the object;

automatic gain control means for controlling each of the phototransistors;

means for delaying operations of the automatic gain control means for a predetermined period of time;

an operable circuit for generating a distance signal between the camera and the object from the electric signals.

4,586,807

TRANSFER-TYPE ELECTROSTATIC RECORDING METHOD

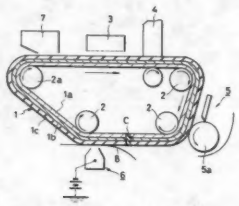
Kazuhiro Yuasa, Zama, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Mar. 19, 1984, Ser. No. 590,849

Claims priority, application Japan, Mar. 19, 1983, 58-45320

Int. Cl.⁴ G03G *15/00*

U.S. Cl. 355—3 BE **8 Claims**



1. An imaging method comprising the steps of:

forming an electrostatic latent image on an imaging member which moves along a predetermined path, said imaging member including a specified region whose electrical resistance exceeds a predetermined allowable limit;

developing said latent image by applying a developing agent thereto to form a developed image in a developing region defined along said predetermined path; and

transferring said developed image to a transfer medium in an image transfer region defined along said predetermined path, whereby said transferring step is held inoperative at least while said specified region moves through said developing region.

4,586,808

OPTICAL SYSTEM DRIVE FOR IMAGE FORMATION APPARATUS

Yasufumi Tanimoto, Kanagawa; Junji Watanabe, Yokohama, and Toshiyuki Sogo, Kanagawa, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 388,174, Jun. 14, 1982, abandoned. This application Mar. 15, 1985, Ser. No. 712,929

Claims priority, application Japan, Jun. 18, 1981, 56-94901; Jun. 18, 1981, 56-89829[U]; Jun. 25, 1981, 56-98850; Jul. 6, 1981, 56-104414; Jul. 14, 1981, 56-104338[U]

Int. Cl.⁴ G03G *15/00*

U.S. Cl. 355—8 **1 Claim**

1. An image formation apparatus, of the table type, for reproducing an image of a document, comprising:

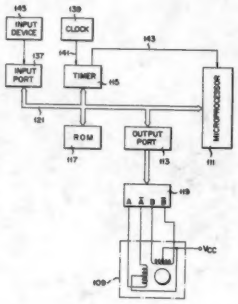
scanning means for scanning a surface of the document in order to produce a latent image of the document, said scanning means including a movable optical system including movable reflectors;

a pulse motor for driving said movable reflectors;

mode selecting means for selecting reduced scale, equal size or enlarged copying modes to change a scanning velocity during formation of the latent image;

memory means for storing pulse motor drive data corresponding to each of the reduced scale, equal size or enlarged copying modes selected by said mode selecting means;

open loop controlling means having a timer, and being connected to said pulse motor, said mode selecting means and said memory means, for reading out from said memory means the pulse motor drive data corresponding to the reduced scale, equal size or enlarged copying mode which is selected by said mode selecting means, to permit the pulse motor drive data to be set to said timer, for controlling a rotation velocity of said pulse motor in an open loop fashion in accordance with the mode selected by said mode selecting means and for judging, upon detection of a time-out signal from said timer, that the excitation time



for the excitation phase of said pulse motor has elapsed, for reading out from said memory means the pulse motor drive data corresponding to the next excitation phase and then for setting said pulse motor drive data, read from said memory means, to said timer;

hard copy reproducing means for reproducing said latent image of said document in hard copy form.

4,586,809

LIQUID DEVELOPING EQUIPMENT FOR ELECTROPHOTOGRAPHIC COPYING MACHINE

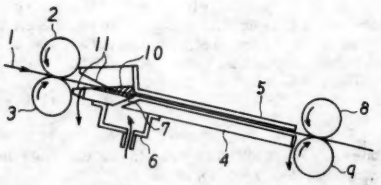
Yoshio Miyauchi; Kiyosi Takenaka, and Yoshihiko Bessho, all of Hikone, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed May 9, 1984, Ser. No. 608,438

Claims priority, application Japan, May 26, 1983, 58-81009[U]

Int. Cl.⁴ G03G *15/10*

U.S. Cl. 355—10 **3 Claims**



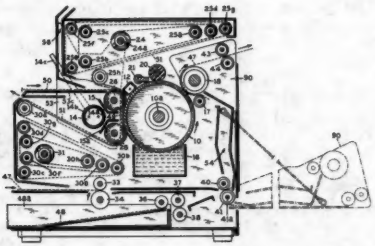
1. Apparatus for inclusion in a copying machine for developing an electrostatic latent image present on the format surface of a photosensitive sheet by a liquid toner developing solution flowing along a flow channel between a pair of opposed tilted plates comprising a developing solution storage tank at the upstream end of the flow channel for flowing the developing solution along the back surface of the sheet and a developing solution discharge outlet positioned at the upstream end of the flow channel facing the format surface of the sheet for flowing developing solution along the format surface of said sheet.

4,586,810

ENGINEERING DRAWING ELECTROPHOTOCOPIER

Benzion Landa, Edmonton, Canada, assignor to Savin Corporation, Stamford, Conn.

Filed Nov. 7, 1980, Ser. No. 204,775
Int. Cl.[4] G03G *15/04*
U.S. Cl. 355—12 12 Claims



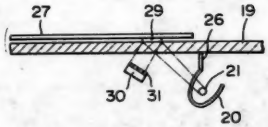
1. A machine for making an electrophotocopy of an original having a certain length including in combination a drum having a photoconductive surface, a membrane having two surfaces, one membrane surface being disposed in contact with the photoconductive surface, the original being disposed in contact with the other membrane surface, and means for directing light through the original and the membrane to the photoconductive surface, the circumference of the drum surface being less than said length.

4,586,811

CONFIDENTIAL DOCUMENT REPRODUCTION PREVENTION METHOD

Keishi Kubo; Takaaki Miyashita, and Akiyoshi Yasumori, all of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 14, 1983, Ser. No. 484,815
Claims priority, application Japan, Apr. 23, 1982, 57-068394
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—14 R 9 Claims



1. A confidential document reproduction prevention method for use in a reproduction machine, comprising the steps of:

attaching a fluorescent material to at least one portion of an original confidential document, said fluorescent material, when exposed to infrared radiation, being capable of emitting visible light, said fluorescent material being selected from the group consisting of YF_3, LaF_3, GdF_3, LuF_3, $BaYF_5$, $BaLuF_5$, BaY_2F_3, BaF_2, $LiYF_4$, Y_2O_2S, La_2O_2S, $LaGaO_3$, Gd_2O_2S, Y_2O_3, Gd_2O_3, Y_3OCl_7, YOCl, YbOCl, YCl_3, $YbNa(WO_4)_2$, $LaGaO_3$ and YbOCl-MRX_4, wherein M represents an alkaline metal, X represents halogen, and R represents Y, La, Gd or Lu, said fluorescent material being doped with a combination of rare earth elements wherein said combination of rare earth elements is a combination of Ce or Yb, and at least one element selected from the group consisting of Er, Ho and Tm;

in said reproduction machine, exposing said original document which bears said fluorescent material to infrared radiation so that visible light is emitted by said fluorescent material;

detecting said emitted visible light by a detector element which is capable of generating a detection signal upon detecting said emitted visible light; and

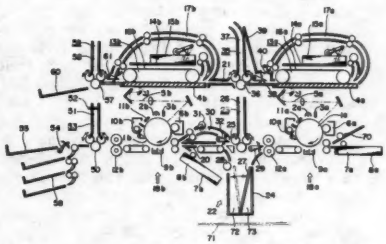
stopping or cancelling at least one of the steps indispensable for reproduction of said original document in said reproduction machine in response to said detection signal from said detector element.

4,586,812

COPYING APPARATUS

Tamaki Kaneko, Fujisawa; Yasuhiro Takahashi, Tokyo; Tsugio Okuzawa, Tokyo; Isao Nakamura, Tokyo, and Kohshi Ebata, Yokohama, all of Japan, assignors to Ricoh Company, Ltd.

Filed Oct. 31, 1984, Ser. No. 666,983
Claims priority, application Japan, Nov. 1, 1983, 58-205419; Nov. 2, 1983, 58-206786; Nov. 4, 1983, 58-207166; Nov. 9, 1983, 58-210595; Nov. 9, 1983, 58-210596; Nov. 11, 1983, 58-212233; Nov. 14, 1983, 58-213815
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—24 11 Claims



1. A copying apparatus capable of copying and printing an image of a document on a printing sheet on one or both sides thereof, comprising:

a pair of image recording units, each said unit comprising a document exposure station, a document conveying means for conveying a document to said exposure station, an image recording member, an optical system for exposing said image recording member to an optical image of a document at said exposure station, a developing device for developing an exposed image on said image recording member, and a printing sheet conveying path for conveying a printing sheet to transfer a developed image from said image recording member to the printing sheet;

a printing sheet transporting path connecting the printing sheet conveying paths of the pair of image recording units together;

a printing sheet reversing intermediate tray arranged in the ptinting sheet transporting path and provided with a switch member for selectively guiding printing sheets from said transporting path to said intermediate tray;

a partition plate pivotably supported in the printing sheet reversing intermediate tray;

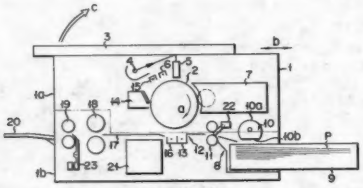
a drive unit for driving said partition plate for pivotal movement from a printing sheet receiving position to a sheet feeding position; and

a sheet feeding roller associated with said intermediate tray for feeding printing sheets from the feeding position.

4,586,813
IMAGE FORMING APPARATUS

Fumito Ide, Zama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 12, 1984, Ser. No. 649,717
Claims priority, application Japan, Sep. 19, 1983, 58-172574; Oct. 12, 1983, 58-190328
Int. Cl.[4] G03B *27/48, 27/50;* B65H *7/00*
U.S. Cl. 355—50 9 Claims



5. An image medium feeding apparatus for feeding an image medium to an image forming apparatus comprising:

storage means for containing said image medium;

feed roller means for feeding said image medium, said feed roller means being rotatable and having a contact surface and a non-contact surface, said feed roller means being disposed to cause said contact surface to contact said image medium when said contact surface is adjacent to said image medium, and to cause said non-contact surface not to contact said image medium when said non-contact surface is adjacent to said image medium;

shaft means, coupled to said feed roller means, for rotating said feed roller means, said shaft being formed with an exterior surface defining at least two external projections;

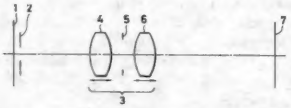
drive means for producing and coupling rotational motion to said shaft means; and

locking means for coupling with one of said projections, and for releasing said one projection and coupling with another of said projections, thereby locking said shaft means at discrete locations and allowing a predetermined amount of rotation between said discrete locations, rotation of said feed roller means between said discrete locations corresponding to portions of a feeding operation.

4,586,814
VARIABLE POWER PROJECTING DEVICE

Mitsuhiro Tokuhara, Chigasaki, and Setsuo Minami, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1983, Ser. No. 535,700
Claims priority, application Japan, Oct. 5, 1982, 57-175853
Int. Cl.[4] G03B *27/52*
U.S. Cl. 355—55 6 Claims



1. A variable power projecting device for projecting an image of the surface of a body onto a light receiving surface, comprising:

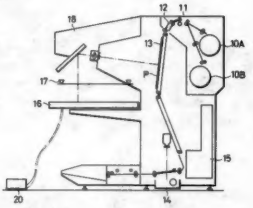
an optical system for focusing on the light receiving surface the image of information on the surface of the body, said optical system comprising first and second optical element blocks provided symmetrically with each other with respect to a stop, said optical element blocks each having at least a lens, and at least said one lens of each of said optical element blocks being moved symmetrically with respect to said stop for varying the focusing magnification of the image focused on the light receiving surface so that the change of refractive power of said optical element blocks resulting from the movement of said symmetrically moved lenses compensates for the change of the exposure amount on the light receiving surface in association with the change of the focusing magnification; and

light restricting means disposed between said optical system and the surface of said body and in the vicinity of the surface of said body.

4,586,815
ORIGINAL TABLE FOR USE IN AN IMAGING APPARATUS OR THE LIKE

Fumio Hoshino, and Yasuyoshi Mochizuki, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 10, 1984, Ser. No. 629,381
Claims priority, application Japan, Jul. 11, 1983, 58-126324
Int. Cl.[4] G03B *27/62, 27/64*
U.S. Cl. 355—76 4 Claims

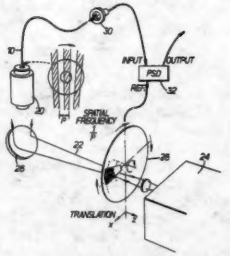


1. In an original table for use with an imaging apparatus or the like of a type wherein an original to be imaged is held in position by suction, the improvement wherein a surface of said table having holes through which air is drawn to provide said suction is covered with a sheet of nonwoven fabric having a high air permeability and high light reflectance, wherein said sheet is porous and has non-visible ports through which said air is drawn.

4,586,816
OPTICAL FIBRE SPOT SIZE DETERMINATION APPARATUS

William J. Stewart, Blakesley, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Dec. 23, 1983, Ser. No. 564,826
Claims priority, application United Kingdom, Dec. 24, 1982, 8236784
Int. Cl.[4] G01N *21/84*
U.S. Cl. 356—73.1 7 Claims



1. Apparatus for measuring the spot size of light emerging

from an optical fibre of the light guiding type comprising: means for imaging a beam of light onto one end of a fibre to be examined, light detection means situated at the other end of the fibre, means to modulate the beam of light entering the detection means substantially independently of said optical fibre, means connected to the output of said detection means for measuring the amplitude of said modulated beam of light, and means for varying the spatial frequency of the modulated beam of light substantially independently of said optical fibre to change the amplitude of said modulated beam of light to enable the size of a spot of light emerging from the fibre to be derived.

4,586,817

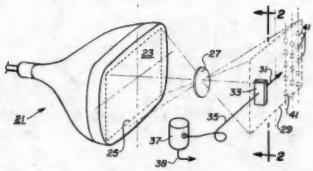
METHOD FOR DETERMINING THE MTF OF A VIEWING WINDOW

George M. Ehemann, Jr., Manheim Township, Lancaster County, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 27, 1984, Ser. No. 583,973

Int. Cl.[4] G01M *11/02*

U.S. Cl. 356—124.5 **17 Claims**



1. A method for determining the value of the MTF (modulation transfer function) at a particular spatial frequency of a viewing window, said method consisting essentially of

A. producing a pattern of light at one surface of said window, said pattern consisting of alternate areas of light and darkness along a particular path, said alternations corresponding substantially to said particular spatial frequency,

B. projecting at least a portion of said light pattern including said path through said window,

C. scanning said projected portion of said light pattern along the projection of said path in an image plane in such manner as to produce an image signal that is alternating in character at substantially said spatial frequency,

D. calculating the average maximum value V_{max} and the average minimum value V_{min} of said image signal and

E. calculating said value of the MTF according to the formula

$$MTF = \frac{V_{max} - V_{min}}{V_{max} + V_{min}}.$$

4,586,818

MEASURING STATION FOR A PHOTOMETER

Willy Lohr, Wildbad, Fed. Rep. of Germany, assignor to Laboratorium Prof. Dr. Rudolf Berthold, Wildbad, Fed. Rep. of Germany

Filed Oct. 26, 1983, Ser. No. 545,501

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1982, 8230199[U]

Int. Cl.[4] G01N *21/00, 21/01*

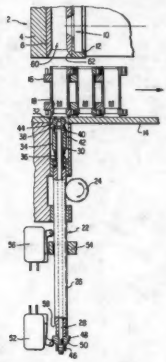
U.S. Cl. 356—244 **19 Claims**

1. A measuring station for a photometer comprising:

a hollow measuring chamber, said hollow measuring chamber having at least one aperture therein, said at least one aperture connecting the interior of said hollow measuring chamber with the exterior thereof;

a plunger for introducing a sample into said hollow measuring chamber through said at least one aperture; and

a sealing element on said plunger, said sealing element having a first position in which the area circumscribed by the periphery of said sealing element is less than the minimum cross-sectional area of said aperture, and being expandable radially relative to said plunger to a second position; and



wherein expansion of said sealing element when said sample is introduced into said hollow measuring chamber seals said plunger to said measuring chamber in said aperture.

4,586,819

LASER RAMAN MICROPROBE

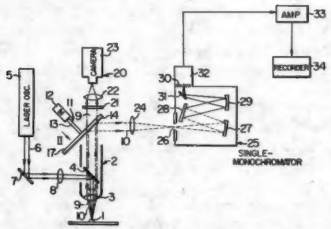
Kenji Tochigi; Yoshiaki Hanyu, and Yutaka Hiratsuka, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 5, 1983, Ser. No. 510,912

Claims priority, application Japan, Jul. 9, 1982, 57-118514; Oct. 6, 1982, 57-174529; Dec. 10, 1982, 57-215404

Int. Cl.[4] G01J *3/44;* G01N *21/65*

U.S. Cl. 356—301 **14 Claims**



1. A laser Raman microprobe for analyzing a sample comprising:

a microscope;

a laser oscillator;

laser directing means for directing a laser beam generated by said oscillator to the sample through said microscope;

an optical system for passing along at least a portion thereof in combination both a laser beam reflected by the sample and applied to the microscope and Raman scattered light generated by the sample and applied to the microscope,

said optical system including filter means disposed at an angle in an optical path the reflected laser beam and the Raman scattered light for separating the reflected laser beam and the Raman scattered light having wavelengths dependent upon the wavelength of said laser oscillator; and

a sample analyzer including a single-monochromator cou-

pled to said optical system for analyzing the sample based on a resulting spectrum;

said filter means directing the separated Raman scattered light directly to said single-monochromator.

4,586,820

APPARATUS FOR MEASURING ANISOTROPY OF LIGHT EMITTED FROM THE SAMPLE

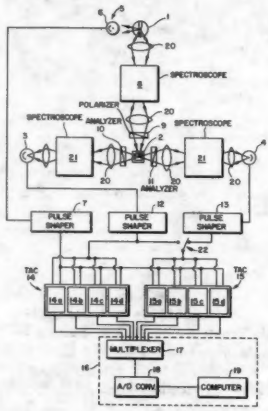
Issei Yokoyama, and Kiyoaki Hara, both of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Filed Mar. 27, 1984, Ser. No. 594,482

Claims priority, application Japan, Mar. 31, 1983, 58-58432

Int. Cl.[4] G01J *3/443*; G01N *21/64*

U.S. Cl. 356—317 **2 Claims**



1. An apparatus for measuring an anisotropy of light emitted from a sample by detecting a vertical polarized component and a horizontal polarized component of light emitted from said sample when said sample is excited by polarized light so as to obtain an anisotropy curves from histograms showing the intensity of said polarized light components with respect to time, said apparatus comprising:

two photodetectors for detecting light emitted from said sample;

an analyzer for allowing a polarized light component parallel with the polarization direction of said exciting polarized light projected on said sample to pass therethrough, said analyzer positioned between one of said photodetectors and said sample;

another analyzer for allowing a polarized light component perpendicular to the polarization direction of said exciting polarized light projected on said sample to pass therethrough, said another analyzer positioned between the other of said two photodetectors and said sample;

two sets of time to amplitude converters which simultaneously start to operate at a standard time when exciting polarized light is projected on said sample, each set of time to amplitude converters being individually connected to corresponding photodetectors;

wherein one set of time to amplitude converters is arranged to stop operating separately from the other set of time to amplitude converters by using a photopulse generated in each photodetector as a stop pulse and wherein simultaneous detection of said vertical and horizontal polarized light components can be performed;

said apparatus further comprising a changeover switch positioned between said two sets of time to amplitude converters and said two photodetectors such that photopulses detected by one of said two photodetectors can be counted by both of said two sets of time to amplitude converters.

4,586,821

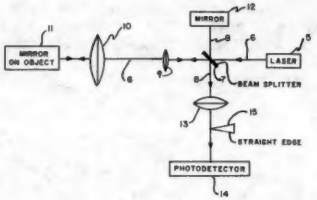
OPTICAL ANGULAR/LINEAR MOTION DETECTOR

Suresh Chandra, Falls Church, and Robert S. Rohde, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 19, 1984, Ser. No. 652,041

Int. Cl.[4] G01P *3/36*

U.S. Cl. 356—363 **6 Claims**



1. An optical device for detecting angular or linear motion of an object by the motion of a mirror affixed thereto, including:

a photodetector;

a laser for providing a beam of light;

means for directing a first portion of said light onto said mirror and selectively directing a second portion of said light toward said photodetector, and for directing at least a part of the first portion of said light reflected from said mirror toward said photodetector;

a straight edge interposable between said means for directing and said photodetectors;

a lens for focussing light from said means for directing onto the edge of said straight edge when said straight edge is interposed, whereby when said second portion of said light and that part of said first portion of said light reflected from said mirror, both are focussed on said photodetector, said photodetector has an output indicative of linear motion of said target, and whereby when said straight edge is interposed and said second portion of said light is not selectively directed, at least a part of the first portion of said light reflected from said mirror is directed toward said photodetector, and is focussed thereon, and whereby said photodetector has an output indicative of angular motion of said target, further whereby when said straight edge is interposed and when said second portion of said light is directed toward said photodetector, at least a part of the first portion of said light reflected from said mirror and at least a part of said second portion of said light are focussed onto said photodetector, whereby said photodetector has an output indicative of both linear and angular motion.

4,586,822

INSPECTING METHOD FOR MASK FOR PRODUCING SEMICONDUCTOR DEVICE

Akikazu Tanimoto, Yokohama, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Jun. 15, 1984, Ser. No. 620,825

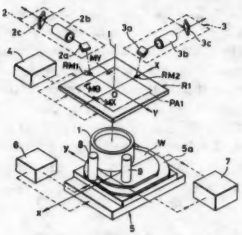
Claims priority, application Japan, Jun. 21, 1983, 58-111534; Jun. 24, 1983, 58-113857; Jun. 30, 1983, 58-119421

Int. Cl.[4] G01N *21/00*

U.S. Cl. 356—394 **10 Claims**

1. A method of inspecting a determined pattern composed of an opaque area and a transparent area on a photomask provided with alignment reference marks, comprising the steps of:

(a) forming an inverted mask provided with an inverted pattern in which the transparent area and the opaque area are inverted with respect to said determined pattern and reference marks corresponding to the reference marks of said photomask;
(b) forming reference marks on a substrate coated with a photosensitive material, corresponding to the reference marks of said photomask;
(c) aligning either one of said photomask and said inverted mask by means of the reference marks of said either one



mask and the reference marks of said substrate and subjecting the photosensitive material of said substrate to a first exposure through said either one mask;
(d) aligning the other of said photomask and said inverted mask by means of the reference marks of said other mask and the reference marks of said substrate and subjecting the photosensitive material of said substrate to a second exposure through said other mask;
(e) developing the photosensitive material of said substrate subjected to said first and second exposures; and
(f) inspecting said substrate after development.

4,586,823

DEVICE FOR MIXING AND APPLYING WET CONCRETE

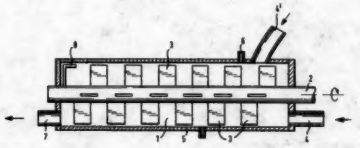
Georg Schöndorfer, Nonner Strasse 2, 8230 Bad Reichenhall, Fed. Rep. of Germany; Johann Fleischer, Sachsenheim 41, A-5020 Elixhausen, Austria; Manfred Stocker, Adolf-Kolping-Siedlung 30, Wiesbachstr. 2, and Günther Körber, both of 8898 Schrobenhausen, Fed. Rep. of Germany

Continuation of Ser. No. 379,776, May 18, 1982. This application Apr. 20, 1984, Ser. No. 601,748

Claims priority, application Fed. Rep. of Germany, May 19, 1981, 3119811

Int. Cl.⁴ B28C *5/14, 5/46*

U.S. Cl. 366—3 **14 Claims**



1. A device for preparing a wet concrete mix, said device comprising:
an elongated tubular swirl chamber having a generally cylindrically shaped interior;
an inlet end at one end of said chamber, said inlet end adapted for the introduction to the chamber of dry particles pneumatically carried by pressurized gas;
an outlet end at the other end of said chamber;
a shaft extending axially in said chamber and adapted for rotation at about 100 RPM or higher;
means for rotating said shaft at about 100 RPM or higher;
blades secured to and extending radially of said shaft, said blades arranged in several rows circumscribing said shaft, the blades in each succeeding row being offset, spaced from and partially overlapping the blades of preceding and succeeding rows, said blades overlapping to form a helical spiral to aid in moving said particles through said chamber, the diameter of the cylinder circumscribed by said rotating blades generally corresponding to the inside diameter of said swirl chamber;
said blades in said helical spiral forming a turbulent swirling distribution of the particles traveling through the chamber when said shaft is rotated at 100 RPM or higher and simultaneously the particles are forced by the pressurized gas through the chamber; and
means for injecting a liquid into the turbulent swirling distribution so as to wet the particles, said wetted particles being ejected out of said outlet by the force of said pressurized gas introduced through said inlet at the same time that said blades in said helical spiral are rotating to form said turbulent swirling distribution.

4,586,824

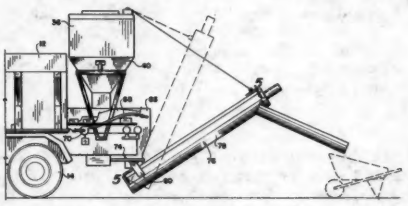
MOBILE CONCRETE MIXING APPARATUS

Paul M. Haws, 3144 S. 57th W. Ave., Tulsa, Okla. 74107

Continuation of Ser. No. 515,535, Jul. 20, 1983, abandoned, which is a division of Ser. No. 364,199, Apr. 2, 1982, Pat. No. 4,406,548. This application Sep. 20, 1984, Ser. No. 653,476

Int. Cl.⁴ B28C *7/00*

U.S. Cl. 366—34 **1 Claim**

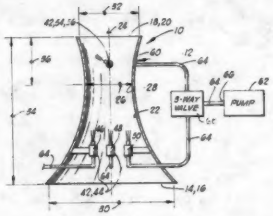


1. A truck having a forward and rearward end and having means for delivery of material comprising:
a vertical material discharge chute adjacent the truck lower rearward and;
an annular gear surrounding said discharge chute rotating about a vertical axis;
opposed flanges connected to and extending downwardly from said chute and rotated in a horizontal plane by said annular gear;
an elongated auger having an inlet opening adjacent the first end and an outlet opening adjacent the second end, the first end of the auger being pivotally secured to said flanges whereby the auger is supported at the first end and is pivotal in a vertical plane;
a cable having one end affixed to said auger adjacent said second end, the other end of the cable being secured to the truck whereby the auger is supported at both ends;
a power driven gear supported to said truck adjacent said chute, the power driven gear rotating about its vertical axis; and
a chain received around said annular gear and said power driven gear whereby said auger is pivotal in a horizontal plane to properly position said outlet opening for delivery of material.

4,586,825
FLUID AGITATION SYSTEM

Asadollah Hayatdavoudi, 101 Harwell, Lafayette, La. 70503, assignor to Asadollah Hayatdavoudi, Lafayette, La.

Filed Jun. 22, 1982, Ser. No. 390,821
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—137 **67 Claims**



1. A fluid agitating apparatus for agitating a surrounding body of fluid, comprising:

a. a housing adapted to be submerged in the body of fluid to be agitated;

b. an inlet disposed in a first end of the housing;

c. an open second end of the housing;

d. a continuous flow passage disposed through the housing communicating the inlet and the open second end of the housing;

e. first nozzle means, positioned at the housing, for jetting a fluid stream of the surrounding fluid into the flow passage inlet so that fluid from the surrounding body of fluid in which the housing is submerged is drawn into the inlet, through the flow passage, and out the open second end of the housing;

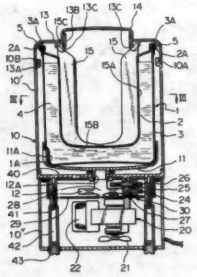
f. second nozzle means for imparting a swirling flow about a longitudinal axis of the housing to the fluid flowing through the flow passage; and

g. means for connecting a source of fluid under pressure to the first and second nozzle means.

4,586,826
DEVICE FOR MAKING FROZEN CONFECTIONS

Susumu Uesaka, Funabashi, and Noriyuki Harada, Fuji, both of Japan, assignors to Nippon Light Metal Co. Ltd., Japan

Filed Dec. 27, 1984, Ser. No. 686,897
Claims priority, application Japan, Dec. 30, 1983, 58-202653[U]
Int. Cl.[4] B01F *15/06*
U.S. Cl. 366—144 **8 Claims**

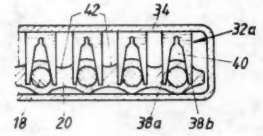


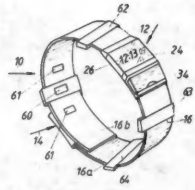
1. A device for making frozen confections comprising a double-walled vessel consisting of a cylindrical inner vessel member and a cylindrical outer vessel member each having an upper open end and a closed bottom, said upper ends of said inner and outer vessel members being hermetically sealed together to form an appropriate annular space and an appropriate bottom space communicating with said annular space between the cylindrical walls and the bottom walls thereof, respectively, a cold keeping agent of an appropriate amount enclosed within said annular and bottom spaces, a receptacle having an inner space adapted to receive therein said double-walled vessel, a cover member detachably and non-rotatably mounted on said receptacle, and a plurality of agitating blades adapted to be arranged in said inner vessel member with the outer edge each of said agitating blades slidably contacting with the inner surface of said inner vessel member, a rotatable table arranged within said inner space of said receptacle substantially intermediate the height thereof and adapted to detachably and non-rotatably mount thereon said double-walled vessel, and means arranged beneath said rotatable table for rotatably driving the same, said agitating blades being adapted to be non-rotatably attached to the lower side of said cover member so as to extend downwardly in said inner vessel member toward the bottom thereof thereby causing relative rotation between said inner vessel member and said agitating blades.

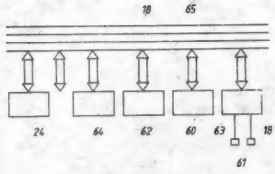
4,586,827
INFORMATION SYSTEM

Hermann Hirsch, Hirschstrasse 5, A-9021 Klagenfurt (Karnten), and Heinrich Pichler, Sailerackergasse 38/2, A-1190 Wien (Osterreich), Austria

Filed Oct. 16, 1984, Ser. No. 663,043
Claims priority, application Austria, Oct. 17, 1983, 3698/83
Int. Cl.[4] G04B *87/00*
U.S. Cl. 368—282 **1 Claim**







1. In an information system with several modules which are attached to a wrist strap, wherein mutually insulated electric connecting wires are embedded, and each module has feed-through means for accommodation of a wrist strap, a device

operable by the user being provided in these feed-through means and being equipped with a plurality of connecting pins electrically connected to inputs and outputs of the module, connecting pins of this device being pluggable, for establishing electrical contact with the connecting wires, into insulating material of the wrist strap; the improvement in which at least one of the connecting wires (18) extends lengthwise of the strap and serves as an antenna, one of the modules (60) is a sensor which collects and processes data, and one of the modules (67) is a telemetering unit electrically connected to both the sensor and the connecting wire serving as the antenna, for transmitting electrically and in a wireless fashion information received from said sensor through said antenna to a remote station.

4,586,828

MEASURING DEVICE FOR DETECTING A LIQUID COMPONENT IN REFRIGERANT

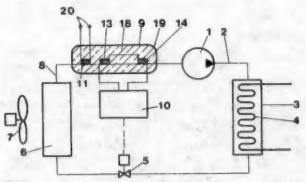
Janos Winter, Mosevang, and Jesper Lichtenberg, Alsgade, both of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Mar. 25, 1985, Ser. No. 715,978

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1984, 3413535

Int. Cl.[4] G01N *25/02*; F25B *49/00*

U.S. Cl. 374—16 **8 Claims**



1. Measuring appratus for a refrigeration system of the type having in series a compressor, a condenser, an expansion valve, an evaporator and a suction conduit between said evaporator and said compressor having an associated heating element for heating said suction conduit, said apparatus including means for detecting the relative quantity of a liquid component in refrigerant in said suction conduit leaving said evaporator, said means including a first temperature measuring sensor in thermal contact with said suction conduit providing a first sensor output signal, said first temperature measuring sensor being located just sufficiently away from said heating element so as to be substantially unaffected by said heating element, and a second temperature measuring sensor in thermal contact with said suction conduit to provide a reference temperature output signal, said second temperature measuring sensor being located at a point where the temperature of said suction conduit is substantially unaffected by the relative quantity of said liquid component in said refrigerant, whereby the difference between the first sensor output signal and the reference temperature output signal is indicative of the relative quantity of said liquid component in said refrigerant.

4,586,829

TEMPERATURE MEASURING RESISTOR PROBE

Erwin Hübner, Grafing, and Hans Meier, Haar, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

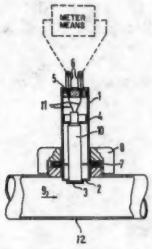
Filed Jul. 11, 1984, Ser. No. 629,905

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327389

Int. Cl.[4] G01K *7/16*; H01C *7/02*

U.S. Cl. 374—144 **3 Claims**

1. A temperature measuring probe for measuring exhaust gas temperature of an internal combustion engine comprising an NTC resistor in a crimped tube, said tube consisting of an NiFeCo-containing melt-down alloy, and said tube being bottomly closed with a sealed cover; said NTC resistor having a lower end region which is received into a central depression formed in said cover; and said NTC resistor having an upper end region which extends through a central hole in a peripherally flanged plate member and said flanged plate member is engaged with radially adjacent portions of said tube; said tube



being sealed at its top with soldering means to a ceramic wafer means which wafer means includes sealed leads for said NTC resistor, and said tube is sealed after evacuation and aeration, whereby said cover is adapted for exposure to such exhaust gases and temperatures sensed by said NTC resistor are measurable through said leads, and said leads are connectable to responsive means to detect temperatures.

4,586,830

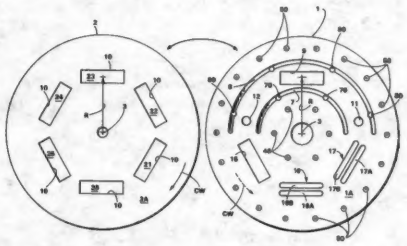
COMBINATION ROTARY GAS BEARING AND SEAL APPARATUS

Donald L. Carter, Vestal, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 16, 1984, Ser. No. 600,630

Int. Cl.[4] F16C *32/06*; F16J *15/40*

U.S. Cl. 384—121 **16 Claims**



1. Gas bearing and seal apparatus comprising:

a first member having a first planar gas bearing surface,

a second member having a second planar gas bearing surface in parallel facing relationship with said first surface, said first and second surfaces being relatively rotatable with respect to each other about an axis normal to said first and second surfaces,

said first surface having a predetermined region therein offset a predetermined radial distance from said axis and not intersected by said axis,

gas supply means for providing a gas between said first and second surfaces to support axially said first and second members with a predetermined spacing between said surfaces, and

gas sink means within a predetermined sector of said first surface relative to said axis, said region being disposed within said sector and said gas being sinked away from said region by said gas sink means,

said gas between said first and second surfaces and said gas sink means coacting to provide a seal about said region, said axis being unsurrounded by said region and said seal.

4,586,831

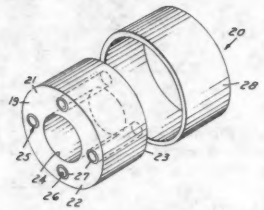
PLASTIC BEARING

James A. Belanger, Northville, Mich., assignor to Belanger, Inc., Northville, Mich.

Filed May 21, 1984, Ser. No. 612,306

Int. Cl.[4] F16C *33/20, 25/02, 35/02*

U.S. Cl. 384—297 **8 Claims**



1. A bearing comprising:

a block of plastic material having first and second sides; and having a perimeter face extending from said first side to said second side about the exterior of the block;

a cylindrically shaped bore extending from said first side toward said second side;

a plurality of fastener bores extending from said first side through to said second side and spaced about the bearing bore, said fastener bores being located symmetrically relative to each other and to the bearing bore for permitting remounting of the bearing to change the portion of the bearing bore which receives the primary wear;

a plurality of rigid sleeves with each sleeve being received in one of the fastener bores and being of a length equal to or slightly longer than the thickness of said block as measured between the first and second sides; and

a housing means in which said block is received with the perimeter face in contact with the housing for protecting the block and preventing cold flow of the plastic material.

4,586,832

ROLLING BEARING FOR USE WITH SCREWTHREADED SPINDLES

Jürgen Oetjen, Herzogenaurach, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

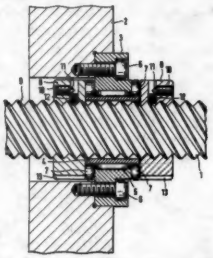
Filed Jan. 3, 1985, Ser. No. 688,628

Claims priority, application Fed. Rep. of Germany, Feb. 29, 1984, 3407423

Int. Cl.[4] F16C *25/06*

U.S. Cl. 384—455 **5 Claims**

1. A rolling bearing comprising: a screw threaded spindle (1), a relatively thick-walled outer race ring (3) secured to a casing (2), said outer race ring having two end faces, an inner race ring (4), rolling members (5) rolling between the two rings, rings of rolling members (7) rolling between the two end faces of the outer race ring (3) and two end plates (8) disposed at a distance from the end faces of the outer race ring and connected to the spindle, said end plates having internal bores therein, the end plates being adjustably mounted on the spindle whereby the preloading of the bearing can be adjusted, characterized in that the two end plates (8) have in their bores an internal screw thread (9) corresponding to the screw thread of



the spindle (1), said end plates serve for securing and axially adjusting the bearing on the spindle.

4,586,833

PRONG-TYPE CAGE FOR ROLLING BEARINGS

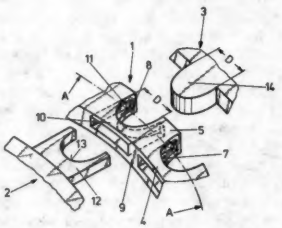
Lothar Walter, Schweinfurt, and Walter Reith, Bad Bocklet, both of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Feb. 27, 1984, Ser. No. 584,089

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1983, 3310938

Int. Cl.[4] F16C *19/20, 33/38*

U.S. Cl. 384;531 **3 Claims**



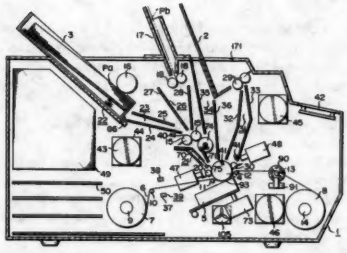
1. In a cast or molded prong-type cage for holding rolling elements which are distributed about the circumference of a rolling bearing, the cage having a bore defining an axis, comprising a side ring with a plurality of circumferentially distributed prongs extending axially therefrom, each two adjacent prongs defining therebetween a pocket for receiving one of said rolling elements, each of said prongs having projections at the ends thereof for axially securing said rolling elements in said cage, the improvement in combination therewith wherein said cage is further provided with a plurality of circumferentially separated axially extending recesses, each of said recesses extending axially through said side ring and communicating with one of said pockets, the axial depth of each of said recesses being less than the axial dimension of said cage in the area of said prongs, each of said recesses having a width in the circumferential direction greater than the diameter of said rolling elements and having a radial dimension less than that of said ring.

4,586,834

TRANSFER APPARATUS FOR MONOCHROMATIC OR MULTI-COLOR PRINTING

Takaaki Hachisuga, Yokohama; Tomohiko Takahashi, Tokyo; Koji Kagaya, Kawasaki, and Masayoshi Nagashima, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 26, 1984, Ser. No. 654,664
Claims priority, application Japan, Sep. 30, 1983, 58-182786
Int. Cl.[4] B41J *3/02, 3/20*
U.S. Cl. 400—120 8 Claims



1. A thermal transfer color printer with printing mode control, comprising:

a transfer medium;

first feeding means for setting and feeding said transfer medium to a first passage including a predetermined transfer position;

a plurality of thermal transfer materials, each one of said plurality of thermal transfer materials having a thermal transfer agent of at least one monochromatic color provided beforehand, and discriminating data, which are peculiar to each thermal transfer material and each color agent coresponding to each thermal transfer material, said discriminating data being provided along a longitudinal direction of at least one end of the wide direction of each thermal transfer material;

second feeding means for selecting among said plurality of thermal transfer materials and feeding the selected thermal transfer material to a second passage including a predetermined transfer position;

printing data output means for outputting printing data;

thermal transferring means, including a thermal print head selectively driven, for thermally transferring the color agent of said thermal transfer material, which is fed by said second feeding means, on said thermal transfer medium, which is fed at said predetermined transfer position by said feeding means, according to said printing data by said thermal print head;

detecting means for detecting the discriminating data, which is provided on said thermal transfer material, at the front side of said predetermined transfer position on said second passage and outputting the corresponding detected data;

determining means for determining the kind of said thermal transfer material by comparing the detected data from said detecting means with the characteristic reference data corresponding to each thermal transfer material provided beforehand; and

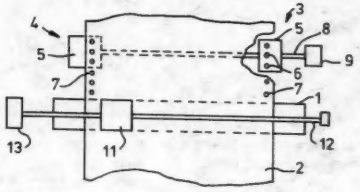
controlling means for outputting a printing mode control signal, which corresponds ot the result of the determination by said determining means, to at least said thermal transfer means.

4,586,835

PRINTER FOR PRINTING CHARACTERS IN TWO ALTERNATIVE PRINT QUALITIES

Randall W. Alexander, and Demetrios Troupes, both of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 602,248, Apr. 20, 1984, abandoned. This application Jan. 29, 1985, Ser. No. 695,997
Int. Cl.[4] B41J *3/12*
U.S. Cl. 400—121 14 Claims



1. A printer for printing characters in two alternative print qualities by printing selected character elements in a matrix of positions arranged in horizontal rows and vertical columns comprising

storage means for storing sets of character data elements, each set defining the shape of a respective character which has a high print quality in the horizontal direction and a low print quality in the vertical and diagonal directions,

printing means for printing character elements defining characters when supplied with character data elements derived from said sets of character data elements,

means for selecting a low or a high print quality,

logic means responsive to the selection of a low print quality to derive subsets of the character data elements of said stored sets, each of which subsets defines the shape of the respective character less densely in the horizontal direction, and

control means responsive to the selection of low print quality to control the operation of said logic means and to supply to said printing means selectively said subsets of character data elements,

whereby said printing means in responsive to the receipt of each of said subsets of character data elements to print character elements defining a respective character which has a low print quality in all directions,

said logic means being further responsive to the selection of a high print quality to perform logical operations on the character data elements of said stored sets so as to generate associated additional character data elements for each set which define the shape of the respective character more densely in the vertical and diagonal directions,

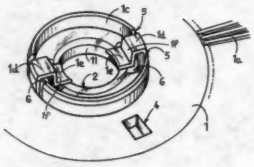
said control means also being responsive to the selection of high print quality to control said logic means and to supply to said printing means selectively said stored sets of character data elements together with said associated additional character data elements,

whereby said printing means is responsive to the receipt of each of said stored sets of character data elements and the associated additional character data elements to print character elements defining a respective character which has a high print quality in the horizontal direction, vertical and diagonal directions.

4,586,836
CHARACTERS CARRYING DISC FOR PRINTING MACHINE

Blaise Moulin, Corcelles, Switzerland, assignor to Caracteres S.A., Neuchatel, Switzerland

Filed Feb. 7, 1984, Ser. No. 577,846
Claims priority, application Switzerland, Feb. 9, 1983, 718/83
Int. Cl.[4] B41J *1/08, 1/22*
U.S. Cl. 400—144.2 **2 Claims**

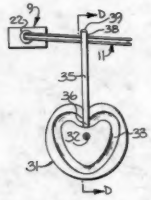


1. A printing wheel disc having a metallic ring defining a central hole within which a drive shaft of a printing machine is received for mounting said disc thereon, said disc having a plurality of tongue members integral therewith extending radially inwardly beyond the edge of the whole and being substantially parallel to the plane of the disc, an annular collar coaxial with said hole and projecting substantially perpendicular from a face of said disc said collar being interrupted by a pair of spaced slots for each tongue member, defining a portion of said collar therebetween, a resiliently deformable arm means connecting each tongue member to said collar protion enabling resilient displacement of said tongue members for engagement and disengagement of said tongue members with a groove in said drive shaft, said ring having an axial face on which said tongue members are slidably engaged for said radial displacement.

4,586,837
INK RIBBON CARTRIDGE INDICATION SYSTEM FOR PRINTER

Shepard D. Johnson, Charlotte, N.C.; Andrew French, Melbourne, Fla.; Allan E. Ellis, Spartanburg, S.C.; Dennis R. Hedrick, High Point, and Charles D. Helfenberger, Concord, both of N.C., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Aug. 27, 1984, Ser. No. 644,469
Int. Cl.[4] B41J *35/14, 35/18*
U.S. Cl. 400—216.2 **5 Claims**

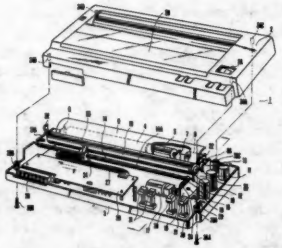


1. A printer comprising
a frame,
a platen mounted on said frame,
a print mechanism for performing printing operation on a print medium,
means for mounting said print mechanism on said frame adjacent to said platen so as to define a print region between said print rhechanism and said platen,
a removable ink ribbon cartridge containing an ink ribbon and including
a body adapted to contain said ink ribbon,
two spaced apart arms pivotally attached to said body and defining a gap therebetween and forming a support for said ink ribbon so that a portion of said ink ribbon extends across said gap,
a first indicator mounted on one of said arms,
means for removably mounting said cartridge body on said frame so that the gap between said arms is located adjacent to said print region and the portion of said ribbon extending across said gap is located within said print region, and
ribbon feed apparatus for feeding said ribbon out of said cartridge body, along one of said arms, across said gap, along the other of said arms and back into said cartridge body, and
a ribbon feed drive adapted to connect with said ribbon feed apparatus when said cartridge is in position on said frame so as to operate said ribbon feed apparatus,
characterized by the improvement that said printer also comprises
a cartridge arm moving mechanism including
a drive system,
means for removably coupling said drive system to the arms of a ribbon cartridge in position in said frame so that said arms can be pivoted independently of said cartridge body whereby said ink ribbon can be moved within said print region in the direction transverse to its length, and
an indicator system including
a sensing device,
means for mounting said sensing device on said frame so that said sensing device senses the position of said first indicator when said cartridge is in position on said frame, and said one of said arms is in position coupled to said drive system,
signal generating means in said sensing device for generating a signal corresponding to the sensed position of said first indicator and for interpreting said signal and for indicating the position of said arm and hence the transverse position of the portion of the ink ribbon within said pring region.

4,586,838
COMPACT BATTERY OPERATED PRINTER

Kenji Hara, Kitamoto; Yukihiro Nagahori, Kitaadachi; Tsugio Watanabe, Kumagaya; Akio Itoh, Kounosu, and Hikoshi Izumi, Hanyu, all of Japan, assignors to Jeco Co., Ltd., Kanagawa, Japan

Filed Mar. 26, 1985, Ser. No. 716,060
Claims priority, application Japan, Jun. 5, 1984, 59-83941[U]
Int. Cl.[4] B41J *25/28, 3/36, 29/02*
U.S. Cl. 400—320 **6 Claims**



1. A handy type printer comprising: a housing; a dry cell chamber disposed along one longitudinal wall of said housing for accommodating a plurality of cascade-connected dry cells, the width of said chamber being slightly larger than the diameter of said dry cells;
rotatable cylindrical platen means disposed adjacent to and in

parallel with said dry cell chamber for line feeding paper thru said printer;

paper feed motor means disposed at one end portion of said dry cell chamber coaxially with said plurality of cascade connected dry cells for rotating said platen means;

a head-driving screw shaft disposed adjacent to and in parallel with said platen;

a head carried by said head-driving screw shaft;

head-driving motor means disposed adjacent to and in parallel with one end portion of said head-driving screw shaft for rotating said head-driving screw shaft;

first and second shaft bearing members disposed at both ends, respectively, of said platen means and said head-driving screw shaft so as to support them; and

a plurality of reduction gears rotatably mounted on said first shaft bearing member to transmit the torque of said paper feed motor means to said platen means and to transmit the torque of said head-driving motor means to said head-driving screw shaft.

4,586,839

PAPER GUIDING DEVICE FOR PRINTER

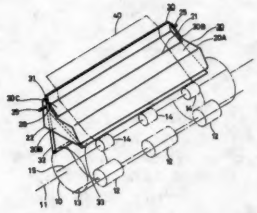
Fusao Iwagami, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 6, 1984, Ser. No. 577,353

Claims priority, application Japan, Feb. 15, 1983, 58-21358[U]

Int. Cl.[4] B41J *11/66*

U.S. Cl. 400—619 **8 Claims**



1. A paper guide device for guiding a recording paper from a printing position of a printer, provided over a platen, comprising:

upper guide means comprising an upper plate and side plates extending across the width of the recording paper above the platen, rotatably and detachably associated with the printer; and

lower guide means extending across the width of the recording paper above the platen beneath the upper plate of said upper guide means within the side plates and rotatably supported by said side plates;

said upper guide means and lower guide means defining a path for passing the recording paper between said upper guide means and said lower guide means.

4,586,840

ELASTIC JOINT

Reinhard Buhl, Bohmte, Fed. Rep. of Germany, assignor to Lemförder Metallwaren, Fed. Rep. of Germany

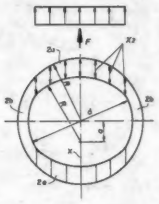
Filed Mar. 29, 1984, Ser. No. 594,874

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1983, 3312090

Int. Cl.[4] F16D *1/00*

U.S. Cl. 403—228 **9 Claims**

1. In a joint having an intermediate socket (2) of elastic material adheringly clamped between a housing (3) and an inner part (1), the improvement wherein, in a zone extending to both sides of a central plane (X) of the inner part, passing through a main loading direction (F), and considered in sections parallel to this central plane, the intermediate socket has a constant material thickness.



4,586,841

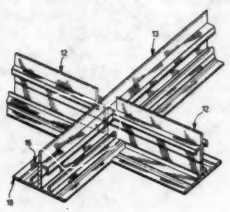
SUSPENDED CEILING

Richard P. Hunter, 373 Davisville Avenue, Toronto, Ontario, Canada

Filed Jun. 1, 1984, Ser. No. 616,251

Int. Cl.[4] E04B *5/52;* **E04C** *2/42*

U.S. Cl. 403—230 **2 Claims**



1. A joint for easily connecting and disconnecting extrusion members for forming a ceiling grid, the joint comprising in combination, (a) a first extrusion member having a vertical web extending longitudinally having spaced apertures therethrough, a first pair of vertically spaced laterally extending flanges opposite the top and bottom of the web extending away from one side of the web coextensive with the length of the web and a second pair of vertically spaced laterally extending flanges at the top and bottom of the web extending away from the side of the web in a direction opposite the first pair of flanges and coextensive with the length of the web, one lip extending vertically from each flange towards the opposite flange along the length of each flange spaced a predetermined distance from the web to define two pairs of vertically aligned width channels between the lips and the web on both sides of the web, at least two lips secured to the flanges extending from the bottom of the web being secured intermediate the side edges of the flanges to which it is secured and the web whereby the two flanges secured to the bottom of the web carry two coplanar support flanges extending laterally from the web beyond the width of the two channels on both sides of the web; and, (b) a second modified extrusion member having a vertical web extending longitudinally, having spaced apertures therethrough, a first pair of vertically spaced laterally extending flanges at the top and bottom of the web extending away from one side of the web coextensive with the length of the web and a second pair of vertically spaced laterally extending flanges at the top and bottom of the web extending away from the side of the web in a direction opposite the first pair of flanges and coextensive with the length of the web, one lip extending vertically from each flange towards the opposite flange along the length of each flange spaced a predetermined

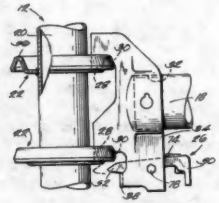
distance from the web to define two pairs of vertically aligned equal width channels between the lips and the web on both sides of the web, at least two lips secured to the flanges extending from the bottom of the web being secured intermediate the side edges of the flange to which it is secured and the web whereby the two flanges secured to the bottom of the web carry two coplanar support flanges extending laterally from the web beyond the width of the two channels on both sides of the web, the opposite ends of the second modified extrusion member each presenting a longitudinally extending web coplanar with the vertical web, the longitudinally extending web of a height substantially equal to the height of the vertical space between each of the two pairs of vertically spaced flanges of the first extrusion member and of the same thickness as the width of the channels each such longitudinally extending web carrying (i) a centrally disposed locating pin extending longitudinally away from the centre of the leading edge of the web, and (ii) a pair of aligned notches in the top and bottom of the web, each notch being longitudinally spaced from the leading edge by a distance equal to the width of the channels between the lips and the web of the first extrusion member and each notch being of a width and depth substantially equal to the width and the vertical height of the lip of the first extrusion member, the longitudinally extending webs presented at the opposite ends of the second modified extrusion member extending a distance to be secured in one of the spaced apertures of the first extrusion members whereby when the joint is formed by inserting the locating pin in an aperture through the vertical web of the first extrusion member and rotating the second modified extrusion member to align the vertical web of said member vertically parallel with the vertical web of the first extrusion member, the longitudinally extending web carrying the locating pin fills the vertical height and lateral width of the channels formed between the lips and the web of the first extrusion member, with the pair of notches in the web carrying the locating pin receiving the lips of the first extrusion member, and the weight of the first extrusion member and the second modified extrusion member in the joint formed is not resting on the locating pin of the second modified extrusion member (and whereby the second extrusion member may be secured simultaneously to two first extrusion members).

4,586,842

SCAFFOLD JOINT FOR A SCAFFOLD STRUCTURE

Joseph S. Puccinelli, Milwaukee, Wis., assignor to Figgie International, Inc., Ohio

Filed Aug. 23, 1985, Ser. No. 768,876
Int. Cl.[4] E04G *7/00*; F16B *9/00*
U.S. Cl. 403—246 **7 Claims**



1. A scaffold joint for connecting the ends of a horizontal scaffold member to a vertical scaffold member comprising:

a pair of ring support members fastened to the vertical scaffold member in a vertically spaced relationship;

an end connector assembly fastened to the end of a horizontal scaffold member, said end connector assembly comprised of an end connector member and a locking wedge assembly slidably mounted thereon, said end connector member having a pair of ring engagement portions adapted for removable engagement with said spaced ring support members, said locking wedge assembly adapted when moved to its locked position to make tight contact with one of said ring support members to thereby cause said ring engagement portions to be forced into tight contact with said ring support members;

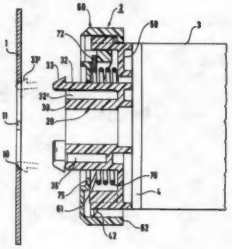
said locking wedge assembly including a wedge member and a wedge retainer member, said wedge retainer member is free floating relative to said wedge member and cooperates with a bolt member mounted in said end connector member to prevent inadvertent dislodgement of the locked wedge assembly in use.

4,586,843

DEVICE FOR ATTACHING AN OBJECT TO A WALL

Jean-Paul Heng, Lyons; André Marmonier, Bron, and Etienne Briguet, Rillieux la Pipe, all of France, assignors to Cgee Alsthom, Levallois-Perret, France

Filed Feb. 27, 1984, Ser. No. 584,214
Claims priority, application France, Feb. 28, 1983, 83 03244
Int. Cl.[4] F16B *9/02*
U.S. Cl. 403—252 **10 Claims**



1. A device for fixing an object on a wall having an opening therein, said device comprising:

an attachment body (20) having a base (50),

a cylindrical head(30) disposed centrally on said base,

peripheral elastic members (32) terminating in end hooks (33) projecting from said head for engaging said wall about said opening,

a cylindrical sheath (40) fixed to said base and surrounding said head over a part of the length of said head,

a clamping ring (60), mounted on said head and movable along the length thereof,

means (67, 41; 42, 66) carried by said ring and said sheath for translatably guiding said ring relative to said head and for rotatably driving said ring,

means (45, 66) for locking said clamping ring in a low position on said head, connected to said guiding means for unlocking by pressure exerted by said wall on said ring with the insertion of said head in the opening of the wall, and

a resilient coupling means (70) connecting said attachment body and said clamping ring and opposing the action of the ring to place it in the low position on the head and for causing rotatable movement of said ring during unlocking of said locking means in order to enclose said wall between said ring and said hooks.

4,586,844

HYBRID SCAFFOLDING ASSEMBLY

James W. Hammonds, Angleton, and James E. Wheeler, Clute, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 29, 1984, Ser. No. 595,007
Int. Cl.[4] F16B *1/00, 7/04*
U.S. Cl. 403—287 **6 Claims**

1. A hybrid scaffolding assembly (16) which is comprised of

(A) a lower scaffolding tube (12); (B) a removable, pin-type, male coupling connector (18); (C) an upper scaffolding tube 14; and (D) a scaffold adaptor (10);

(A) said lower scaffolding tube (12) being substantially vertically oriented and having a pair of horizontally aligned holes (34, 36) on opposite sides of it;

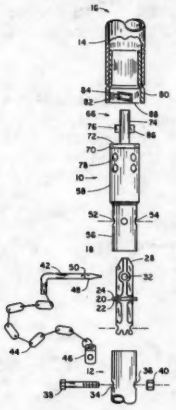
(B) said removable, pin-type, male coupling connector 18 having a lower part (26) which extends downwardly into the top of said tube (12) and an upper part (28) which extends upwardly from the top of said tube (12),

said removable, pin-type, male coupling connector (18) having a shoulder (20) which extends laterally outwardly from about its middle with said shoulder having an upper face (24) and a lower face (22),

said lower face (22) resting on the top of said lower scaffolding tube (12) and being the weight bearing surface for said lower part (26) of said removable, pin-type, male coupling connector (18),

said upper face (24) of said shoulder (20) being adapted to be the weight bearing surface for said upper part (28) of said removable, pin-type, male coupling connector (18),

said removable, pin-type, male coupling connector 818) having a first hole (30) extending transversely through its lower part (26) and a second hole (32) extending transversely through its upper part (28), said hole (30) being aligned with said two holes (34, 36) in said lower scaffolding tube (12), and said aligned holes (30, 34, 36) having a removable pinning means (38) passing therethrough to prevent said lower part (26) of said removable, pin-type, male coupling connector (18) from being removed from the inside of said lower scaffold tubing (12) while said pinning means (38) is in place;



(C) said upper scaffolding tube (14) being also substantially vertically oriented and positioned at a spaced distance above said lower scaffolding tube (12) and being vertically in line therewith,

said upper scaffolding tube (14) having a rotational female coupling means (80, 82) permanently fitted at its lower end,

said rotational female coupling means 80, 82 being adapted to receive a rotational male coupling member (66);

(D) said scaffold adaptor (10) being interposed between said upper and lower scaffolding tubes 14 and (12), respectively,

said scaffold adaptor (10) being comprised of a lower tubular member (56) welded to the lower end of an upper tubular member (58), and a rotational male coupling member (66) which has a lower solid part (68) and an upper solid part (74) which is smaller in diameter than said lower solid part (68),

said lower solid part (68) being permanently affixed in said upper tubular member (58) of said scaffold adaptor (10),

said upper solid part (74) extending upwardly from said upper tubular member (58) of said scaffold adaptor (10),

said lower tubular member (56) being fitted over and around said upper part (28) of said removable, pin-type, male connecting member (18) with the bottom edge of said lower tubular member (56) resting on said weight bearing upper face (24) of said shoulder (20) of said removable, pin-type, male coupling connector (18),

said lower tubular member (56) of said scaffold adaptor (10) having two holes (52, 54) in opposite sides of it in a manner so that they are aligned with said hole (32) which extends transversely through said upper part (28) of said removable, pin-type, male coupling connector 18, there being a removable pin (42) passing through these three aligned holes (52, 32, 54) to prevent said lower tubular member (56) of said scaffold adaptor (10) from becoming inadvertently disconnected from said lower scaffolding tube (12) while in service,

said male rotational member (66) having mating projections (76) extending outwardly from said upper solid part (74), said member 66 being inserted into and matingly engaged with the female couple means (80, 82) of said upper scaffolding tube (14).

4,586,845

MEANS FOR USE IN CONNECTING A DRIVE COUPLING TO A NON-SPLINED END OF A PUMP DRIVE MEMBER

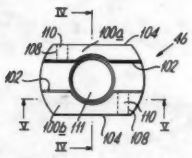
Norman Morris, Buckingham, England, assignor to Leslie Hartridge Limited, Buckinghamshire, England

Filed Jan. 29, 1985, Ser. No. 696,577

Claims priority, application United Kingdom, Feb. 7, 1984, 8403133

Int. Cl.⁴ B25G *3/28*; F16B *2/00*

U.S. Cl. 403—354 **5 Claims**



1. For use in a connection between a drive coupling and a tang end of a pump drive member, an adaptor comprising:

(a) a bifurcation at one end of said adaptor to enable said adaptor to engage a tang end of such a drive member;

(b) mutually inwardly facing flats one on each part of said bifurcation, for engagement with opposite sides of such a tang end; and

(c) outwardly facing flats, one on each part of said bifurcation, to engage mutually facing flats of an elongate hole or recess in a part of such a coupling; and

(d) a circularly cross-sectioned opposite end of said adaptor to enable that end to be located in a hole or recess of corresponding circular cross-section in such a coupling whereby an axis of the coupling is aligned with that of the pump drive member.

4,586,846

METHOD AND APPARATUS FOR REBAR AVOIDANCE

Roger C. Kellison, 8200 Blvd. E., North Bergen, N.J. 07047

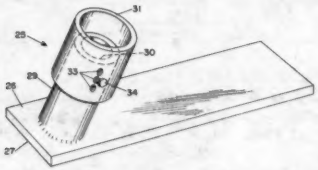
Filed Sep. 27, 1984, Ser. No. 655,507

Int. Cl.⁴ E01F *13/00*

U.S. Cl. 404—6 **17 Claims**

1. A reinforcing bar avoidance fixture for use in drilling into

concrete structure reinforced with reinforcing bars and for routing a drill bit away from a reinforcing bar encountered in a first attempt to drill, the fixture including a support means with a lower surface for resting on a surface of the concrete structure over a hole made during the first attempt to drill, bit guide means supported by the support means and having an opening therethrough inclined at an angle other than 90° with



respect to the lower surface of the support means and adapted to receive and guide a bit therethrough into the concrete structure and past a reinforcing bar at the angle other than 90° with respect to the surface of the concrete structure, the bit guide means terminating in an enlarged collar for engagement by a power tool driving the guided bit, the collar being adjustably fixed on the bit guide means with respect to its distance from the support means to adjust the depth of the inclined hole.

4,586,847

VIBRATORY MECHANISM

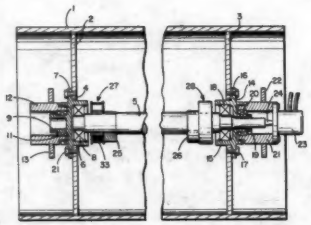
Raymond J. Stanton, Sydney, Australia, assignor to RayGo, Inc., Minneapolis, Minn.

Filed Aug. 6, 1984, Ser. No. 638,124

Claims priority, application Australia, Feb. 10, 1984, 24500/84

Int. Cl.⁴ E01C *19/38*

U.S. Cl. 404—117 **25 Claims**



1. A vibratory mechanism for vibrating a member comprising: a shaft, means for rotatably mounting the shaft on the member, means for selectively rotating the shaft in opposite circumferential directions, weight means eccentrically mounted with respect to said shaft for rotating therewith to vibrate said shaft when rotationally driven, and means mounted on the shaft having a fluent mass which upon shaft rotation in one direction moves to a first location adjacent the weight means to augment the eccentric distribution of said weight means thereby producing high amplitude vibration of the member and upon rotation of the shaft in the opposite direction said fluent mass moves from the first location to a second location spaced from the weight means which tends to balance the eccentricity of the weight means to produce low amplitude vibration of the member.

4,586,848

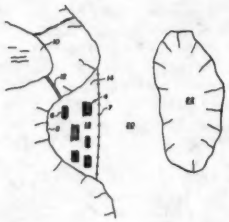
METHOD OF STORING LOGS

Gordon J. Esplin, North Vancouver, Canada, assignor to British Columbia Research Council, Vancouver, Canada

Filed Nov. 27, 1984, Ser. No. 675,353

Int. Cl.⁴ E02B *3/00*

U.S. Cl. 405—60.5 **3 Claims**



1. A method for storing logs comprising:

deploying a containment curtain around a plurality of logs;

admitting fresh water into the region defined by the curtain to form a two layered bay, the upper layer of water comprising fresh water and containing the logs to be stored, the lower layer of water comprising salt water.

4,586,849

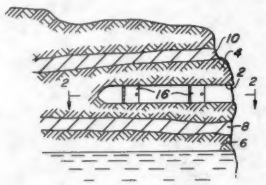
NUCLEAR DISPOSAL METHOD AND SYSTEM

Richard P. Hastings, Washington, Okla., assignor to Nuclear Protection Systems, Inc., Norman, Okla.

Filed Dec. 1, 1983, Ser. No. 557,730

Int. Cl.⁴ B09B *1/00*; G21F *9/24*

U.S. Cl. 405—128 **8 Claims**



1. A repository for the storage of radioactive material and other materials comprising a rock formation located above the water table in which a cavity is formed, the location of the cavity being between two substantially horizontal vertically separated layers of rock and within an intermediate layer, said intermediate layer being between said layers of rock, said layers of rock being substantially impervious to water, said intermediate layer which is more easily penetrated than the two layers of impervious rock and cavity sealing means disposed within said cavity.

4,586,850

UNDERWATER TRENCHING SYSTEM

Robert M. Norman, 128 Nickerson Pkwy., Lafayette, La. 70501, and Franklin C. Wade, 741 Bocage La., Mandeville, La. 70448

Filed Jul. 12, 1983, Ser. No. 513,095

Int. Cl.⁴ E02F *5/02*

U.S. Cl. 405—163 **98 Claims**

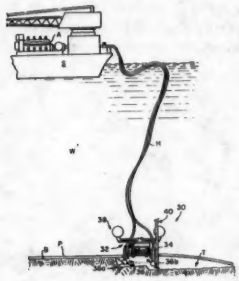
1. An underwater trenching apparatus for burying pipeline and the like comprising:

a frame for positioning about the pipeline to be buried,

a driving means operatively connected to said frame for driving said frame along the pipeline,

said driving means including at least one pair of opposed rollers adapted to drivingly engage the pipeline,

said driving means further including an urging means for urging said curved pipe contact surface against the pipeline,



each said roller having a curved pipe contact surface having a radius not greater than the radius of the pipeline to be buried, and when compressed against the pipeline by said urging means, being in continuous contact with it, and

a cutting means attached to said frame for cutting a trench.

4,586,851

LEVELLING RAM FOR ROOF-SHIELD MINE SUPPORT SYSTEMS

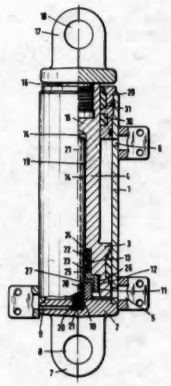
Willy Watermann, Dortmund, Fed. Rep. of Germany, assignor to Kloeckner-Becorit GmbH, Castrop-Rauxel, Fed. Rep. of Germany

Filed Jun. 27, 1984, Ser. No. 625,092

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1983, 8318615[U]

Int. Cl.[4] E21D *17/02, 23/00, 23/16*

U.S. Cl. 405—295 **4 Claims**



1. A roof-shield mine support system, comprising at least a pair of hydraulically operated levelling rams extendable between a shield frame unit and an associated gap-seal plate which is arranged slidably relative to the associated shield frame in a transverse direction relative to the direction of forepoling, each said ram comprising a piston and cylinder unit, opposite sides of said piston being connected to the hydraulic system of said piston and cylinder unit for extending and retracting said piston for aligning the associated shield frame unit relative to an adjacent shield frame unit, the piston rod of said piston having a longitudinal bore open at an outer end of said piston and closed at an end of said piston rod remote from said piston, and an elongated rod disposed within said bore, said rod being sealed relative to the interior of said bore, and the interior of said bore being connected in use to said hydraulic system for applying constant pressure between said piston and said cylinder for pressing the associated gap-seal plate tightly against the adjacent frame unit.

4,586,852

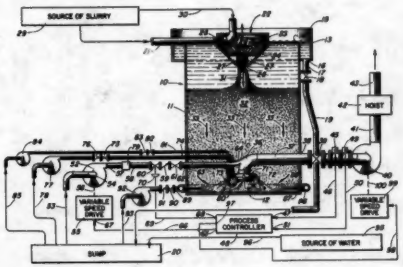
APPARATUS FOR THE RECLAMATION OF SLURRY FROM THE BOTTOM OF A STORAGE SILO

Ronald L. Oda; Jeffrey L. Beck; Robert M. Blubaugh; Gary R. Harris, all of Ponca City, Okla.; Ricky L. Shaw, Bethel Park, and Michael P. Evans, Pittsburgh, both of Pa., assignors to Conoco Inc., Ponca City, Okla.

Filed Jul. 2, 1984, Ser. No. 627,161

Int. Cl.[4] B65G *53/30, 53/66*

U.S. Cl. 406—14 **12 Claims**



1. An apparatus for storing a slurry and for controlling the density of said stored slurry during reclaim comprising:

a. a confining means having at least a side wall and a bottom;

b. means for adding a slurry containing solids and fluid into said confining means;

c. overflow means communicating with said confining means for removing excess fluids;

d. reclaim means including a mouth means facing in a substantially downwardly direction and spaced from said bottom;

e. slurry pump means having an inlet and an outlet;

f. pipe means coupling said slurry pump means inlet through said side wall, and to said mouth means, whereby material in the proximity of said mouth means can be drawn into said mouth means and removed by said slurry pump means;

g. dilution port means mounted in said pipe means between said mouth means and said side wall means to reduce the density of said slurry in a controlled manner;

h. a density measuring means mounted on said pipe means;

i. a process control means having an input and an output with means connecting said input to said density measuring means for measuring the density of slurry in said pipe means and developing a signal at said output corresponding to said density;

j. a source of fluid;

k. a second pump means having an inlet coupled to said source of fluid and an outlet coupled to said dilution port means;

l. dilution control means accepting said signal from said process control means and controlling the fluid passing from said source of fluid through said pump means to said dilution port means, and

m. fluidizing jet means mounted through said side wall and at said bottom, said jet means connected to a source of fluid in a manner to force said slurry along said bottom toward said mouth means thereby maintaining said slurry

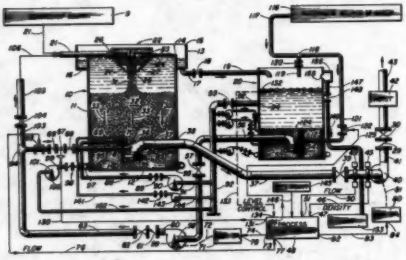
at said bottom of said confining means in a fluid state so that said slurry will freely flow toward said mouth means; whereby an increase in measured slurry density will increase the volume of fluid being added into said pipe means coupling said mouth to said slurry pump means, and a decrease in measured density will cause a decrease in fluids being added into said pipe means.

4,586,853

APPARATUS FOR THE RECLAMATION OF SLURRY FROM THE BOTTOM OF A STORAGE SILO

William T. Sweeney, and Jeffrey L. Beck, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Jul. 2, 1984, Ser. No. 627,167
Int. Cl.[4] B65G *53/30, 53/66*
U.S. Cl. 406—14 **12 Claims**



1. In combination with a storage and reclaim apparatus for handling slurry formed of particulate matter and fluids, wherein said storage and reclaim apparatus includes a first tank means having side wall means and a bottom, means for adding said slurry to said first tank means, a rigidly mounted and downwardly facing mouth spaced from the bottom of said first tank and coupled through a pipe through said side wall means to a pump means, fluidizing jet surrounding said mouth, a dilution control port means mounted in said pipe between said mouth and said side wall means including a dilution control means connecting said dilution control port means to a source of fluid, and an overflow means, said pump means connected to an outlet for disposal of said slurry, an improvement comprising:

a second tank means having a side wall means and a bottom, means for coupling said overflow means to said second tank means, second mouth means mounted in said second tank means and facing said second bottom, means coupled to said second mouth means to move material from the bottom of said second tank means to said first tank means, whereby overflow fluids and particulate material from said first tank means is deposited into said second tank means and drawn from said second tank means and recycled into said first tank means, with at least a portion of said overflow fluids and particulate material inputted as a source of fluid into said dilution control port means.

4,586,854

VENTURI POWDER PUMP HAVING ROTATING DIFFUSER

Allen R. Newman, Lorain, and Kenneth Holley, South Amherst, both of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Jun. 12, 1985, Ser. No. 744,115
Int. Cl.[4] B65G *53/14*
U.S. Cl. 406—153 **14 Claims**

10. Powder pumping apparatus for pumping solid particulate powder from a source of powder, which apparatus comprises,

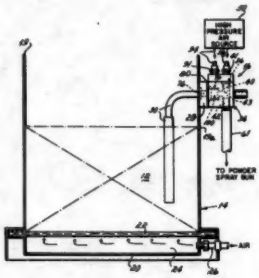
a pneumatic conveyor line having an inlet end and a discharge end, said line having a low pressure venturi pumping chamber contained therein,

a powder flow passage intersecting said venturi pumping chamber,

means for supplying high pressure air to said inlet end of said pneumatic conveyor line,

means for supplying powder to said powder flow passage,

means for drawing said powder through said powder flow passage into said venturi pumping chamber of said pump,



a metering air flow port intersecting said powder flow passage at a location upstream from said venturi pumping chamber,

means for supplying high pressure air to said metering air flow port,

a diffuser located within said powder flow passage, said diffuser having an interior wall, and

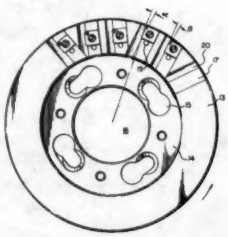
means for rotating said interior wall of said powder flow diffuser so as to better and more evenly distribute powder in an air stream of powder dispensed from said discharge end of said conveyor line.

4,586,855

FACE MILLING CUTTER

Ralph H. Rawle, Windsor, Canada, assignor to J. P. Tool Limited, Windsor, Canada

Continuation of Ser. No. 390,402, Jun. 21, 1982, abandoned.
This application Jan. 15, 1985, Ser. No. 691,728
Int. Cl.[4] B23C *5/20*
U.S. Cl. 407—55 **12 Claims**



1. A face milling tool securable to a rotatable spindle and used to machine a workpiece, said tool comprising:

a plurality of cutting inserts having a first end face forming a bottom face, a second end face forming a clearance face, and a side face forming a rake face which intersects said clearance face to form a substantially straight cutting edge at the line of intersection;

a holder and means securing said holder to said rotatable spindle, said holder having an end face and a plurality of seats formed in said end face for receiving the bottom face of said cutting inserts, said seats being spaced radially

from the longitudinal axis of said spindle and circumferentially around said spindle axis and being stepped radially and axially around the spindle axis;

means securing said inserts to said holder to place the cutting edges of said inserts perpendicularly to the longitudinal axis of said spindle and at a radial shear angle, to place the clearance faces at a shallow angle axially inward, to place the rake faces at an axial rake angle, and to place the cutting edges in an axially stepped relation whereby said inserts engage the workpiece and remove shallow and uniform workpiece chips progressively and axially of said spindle from the top surface of the workpiece down to a finished surface in controlled shallow axial increments.

4,586,856

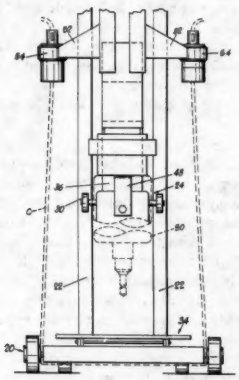
ADJUSTABLE MOBILE SUPPORT FOR ELECTRIC DRILL

Morris L. Waber, 3006 Coy Ave., Kalamazoo, Mich. 49001

Continuation-in-part of Ser. No. 315,915, Oct. 28, 1981, Pat. No. 4,461,594. This application May 4, 1984, Ser. No. 607,274

Int. Cl.[4] B23B *45/14*

U.S. Cl. 408—92 **12 Claims**



1. In combination on a wheeled platform having an upright column near its rear edge with a vertically adjustable arm on said column projecting forwardly over the platform with a first upwardly facing dove-tail connector part on the end of the arm,

a drill feed support tube of non-circular cross section having a slide tube of non-circular cross section telescopically and slidably received therein,

a second dove-tail connector part on the end of said slide tube adapted to be releasably and rotatably connected to an electric drill with the chuck axis of the drill closely adjacent and parallel to the axis of the slide tube,

a third dove-tail connector part secured to a side of said support tube and releasably and rotatably connectable to said first connector part,

a feed screw having a thrust connection at one end to said feed support tube and a traveling nut drivingly engaged with the opposite end of said slide tube from said second connector part,

and a pair of releasable cable grippers connected to opposite sides of said support tube and in spaced parallel relation to the sides and axis of the tube.

4,586,857

HOLE CUTTER

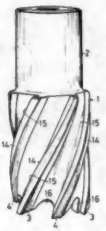
Shohei Ohmi, Anjo, Japan, assignor to Omi Kogyo Co., Ltd., Anjo, Japan

Filed May 4, 1984, Ser. No. 607,360

Claims priority, application Japan, Dec. 17, 1983, 58-238494

Int. Cl.[4] B23B *41/02, 51/04*

U.S. Cl. 408—206 **8 Claims**



1. A hole cutter comprising:

a generally cylindrical cutter body adapted to be rotated by power means and having an end portion, and

a plurality of first and second cutting teeth connected to and situated circularly around the end portion of the cutter body, said first and second cutting teeth being mutually interspersed around the end portion of the cutter body,

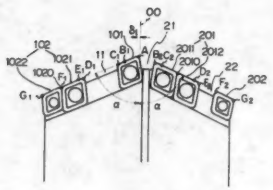
each first cutting tooth including at least one first cutting surface having a predetermined relief angle and a rake angle relative to the horizontal plane perpendicular to the central axis of the cutter body, said relief angle extending rearwardly relative to the rotational direction of the cutter body and the rake angle extending radially of the cutter body, and at least first and second cutting edges situated at a front end of the first cutting surface, said second cutting edge being situated radially outwardly and circumferentially rearwardly away from the first cutting edge relative to the cutter body so that the first and second cutting edges form stepped edges and the second cutting edge is located from the cutter body more remotely than the first cutting edge,

each second cutting tooth including a second inner cutting surface facing radially inwardly of the cutter body and having the same rake angle as the first cutting tooth, a second outer cutting surface facing radially outwardly of the cutter body and having a rake angle greater than that of the first cutting tooth, said second inner and outer cutting surfaces having the same relief angles as that of the first cutting tooth, a crest dividing the second inner and outer cutting surfaces, a third cutting edge situated at a front edge of the second inner cutting surface and being located in the same plane as that of the first cutting edge of the first cutting tooth in the axial direction of the cutter body, and a fourth cutting edge situated at a front edge of the second outer cutting surface and extending radially upwardly of the cutter body to intersect a plane of the second cutting edge of the first cutting tooth, portions of the third and fourth cutting edges of the second cutting tooth adjacent to the crest being located below the second cutting edge of the first cutting tooth in the axial direction of the cutter body so that when the hole cutter is operated, the first and second cutting teeth partly cut a workpiece, and the first cutting tooth cuts separate chips in the radial direction of the hole cutter to thereby reduce resistance for facilitating ejection of the chips from the hole cutter.

4,586,858
ROTARY CUTTING TOOL

Masao Kubota, 2-22-7, Narimasu, Itabashi-ku, Tokyo, Japan

Filed Jul. 30, 1984, Ser. No. 635,501
Claims priority, application Japan, Aug. 2, 1983, 58-140489
Int. Cl.[4] B23B 51/00
U.S. Cl. 408—224 2 Claims



1. A rotary cutting tool having at an axial end surface thereof two cutting edge lines arranged substantially in a diametral plane extending through a center of rotation of the tool, one cutting edge line having an inner cutting edge section (101) adjacent to the center and the other having an inner noncutting edge section (21) adjacent to the center, in which the cutting edge line (20) having the inner noncutting edge section (21) has one intermediate noncutting edge section (22) and the cutting edge line having the inner cutting edge section (101) has at least one intermediate noncutting edge section (11),

said at least one intermediate noncutting edge section (11) of the cutting edge line having the inner cutting edge section is located within a radius from the center larger than a radius from the center of the inner noncutting edge section of the other cutting edge line,

said intermediate noncutting edge section (22) of the cutting edge line having the inner noncutting edge section being located within a radius from the center corresponding to a radius from the center of an outermost cutting edge section (102) of the cutting edge line having the inner cutting edge section,

characterized in that basic dimensions and locations of cutting edge section and noncutting edge sections arranged along both cutting edge lines are determined so as to substantially satisfy the following two equations:

$$b+c-d-e+1=0$$

$$b^2+c^2-d^2-e^2+1=0$$

where:

$b=r_B/r_F$

$c=r_C/r_F$

$d=r_D/r_F$

$e=r_E/r_F$

r_B, r_C, r_D, r_E, r_F and r_G respectively indicating a radius from the center axis (0 0) at respective points, B_2, C_1, D_1, E_2, F_2 and G_1 in both the cutting edge lines, rendering the relative condition below,

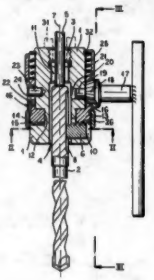
$$r_B \leqq r_C < r_D \leqq r_E < r_F \leqq r_G$$

and determining the dimensions and locations of cutting edge sections and noncutting edge sections.

4,586,859
AUTOLOCKING HAMMER-DRILL CHUCK

Günter H. Röhm, Heinrich-Röhm-Str. 50, 7927 Sontheim, Fed. Rep. of Germany

Filed Sep. 26, 1984, Ser. No. 654,792
Claims priority, application Fed. Rep. of Germany, Sep. 27, 1983, 8327665[U]
Int. Cl.[4] B23B 31/12
U.S. Cl. 408—240 9 Claims



1. In combination with

a hammer drill having a drive spindle rotatable about a spindle axis and a hammer displaceable axially in the drive spindle,

a drill bit having a shank extending along a shank axis and having a radially outwardly open and at least generally axially extending groove, and

a chuck key having a centering tip and a gear crown thereabout,

a chuck comprising:

a generally tubular chuck body centered on a chuck axis and having a central axially extending passage and a radially outwardly open centering hole, the body normally being carried on the spindle and receiving the shank of the drill bit in its passage with the spindle, shank, and chuck axes all coaxial, the hammer projecting axially forward into the passage and being engageable therein with the bit;

a plurality of jaws radially but not angularly displaceable in the chuck body and having inner ends engageable with the drill-bit shank in the passage;

formations angularly nondisplaceable on the chuck body and complementarily engageable in the groove of the drill-bit shank, whereby the formations can angularly couple the chuck body and drill bit;

means including an adjustment ring connected to the jaws for moving same radially synchronously and thereby centering the bit in the body by engagement of the inner ends with the shank, the ring being formed with axially backwardly directed teeth positioned axially forward of the centering hole such that when the chuck key is fitted into the centering hole its crown gear meshes with the ring teeth;

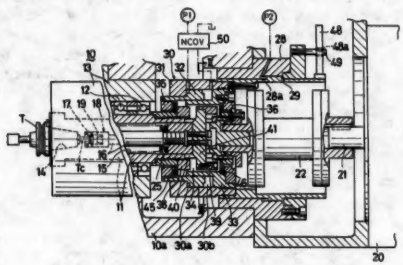
a locking sleeve axially but not angularly displaceable on the body and carrying at least one tooth axially engageable between the ring teeth, the sleeve being axially displaceable on the body between an axially forward locking position with the sleeve tooth engaged with the ring teeth and the sleeve positioned relative to the hole such that the key cannot be fitted to the chuck with the gear meshing with the ring teeth and an axially backward freeing position with the sleeve tooth out of engagement with the ring teeth and the sleeve positioned relative to the hole such that the key can be fitted to the chuck with the gear meshing with the ring teeth; and

biasing means braced between the sleeve and the body for urging the sleeve axially forward into the locking position.

4,586,860
SPINDLE HEAD FOR A MACHINE TOOL

Fumihiko Ohkoshi, Anjoh; Toshifumi Hasegawa, Ohbu, and Norikazu Kanii, Chita, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Sep. 6, 1983, Ser. No. 529,630
Claims priority, application Japan, Jun. 9, 1982, 57-135121[U]
Int. Cl.[4] B23B *31/04;* B23C *5/26*
U.S. Cl. 409—233 6 Claims



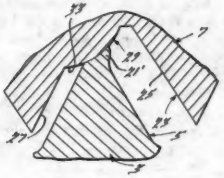
1. A spindle head for a machine tool, comprising:
a head frame;
a tool spindle rotatably carried in said head frame through bearings and formed with a tool receiving bore at a front end thereof and a plurality of elongate holes;
a drive motor mounted on said head frame, with an output shaft thereof being in axial alignment with said tool spindle;
means for drivingly connecting said output shaft of said drive motor with a rear end portion of said tool spindle;
a drawing bar axially movable in said tool spindle for clamping a tool received in said tool receiving bore on said tool spindle and unclamping said tool from said tool spindle;
spring means provided in said tool spindle for urging said drawing bar to move in a first axial direction;
a first annular hydraulic cylinder device formed around said tool spindle for permitting said tool spindle to pass therethrough;
a first operating member movable by said hydraulic cylinder device in an axial direction of said tool spindle when said hydraulic cylinder device is operated for unclamping the tool from the tool spindle;
a first abutting member fixed to said tool spindle and abuttable with said first operating member for cancelling a thrust force acting on said tool spindle when said drawing bar is moved against the force of said spring means;
a second operating member movable by said hydraulic cylinder device relative to said first operating member in the axial direction of said tool spindle when said hydraulic cylinder device is operated for unclamping said tool from said tool spindle; and
a second abutting member secured to said drawing bar and protruding from opposite ends thereof externally of said tool spindle through said elongate holes formed in the tool spindle so as to be engaged with, and to be moved by said second operating member against the force of said spring means.

4,586,861
CONVEX WEDGE RAMP THREAD CONFIGURATION

Arthur J. McKewan, Rochester, Mich., assignor to Microdot Inc., Darien, Conn.

Continuation of Ser. No. 958,356, Nov. 6, 1978, abandoned. This application Jul. 28, 1980, Ser. No. 173,110
Int. Cl.[4] F16B *39/30*
U.S. Cl. 411—311 1 Claim

1. A threaded connection comprising an externally threaded member having a standard thread, and an internally threaded member comprising a body having an aperture with a central axis and a helical internal thread on the internal periphery thereof, said internal thread having angularly related leading and following flanks with a radially inwardly convex ramp at the root therebetween, said ramp comprising a smooth uninterrupted arc of a circle in radial cross section the axis of generation of which lies in a plane extending generally normal to the central axis of said internally threaded member and through a first point at the intersection of said arcuate ramp with said following flank, a tangent to said arcuate ramp drawn through a second point at an opposite end thereof from said first point



extending at an angle axially spaced from and substantially parallel to said following flank and lying within the included angle between said leading and following flanks, said second point on said ramp being spaced radially outwardly from the crest of the thread on said externally threaded member whereby said externally threaded member is initially free running relative to said internally threaded member, engagement of the crest of the thread on said externally threaded member with said ramp being at a successively decreasing angle relative to the central axis of said internally threaded member upon movement of said crest toward the following flank of said internally threaded member.

4,586,862
DRILLING SCREW

Katsuhisa Yamasaki, 403 Hirasawa, Hatano-shi, Kanagawa-ken, Japan

Continuation of Ser. No. 337,278, Jan. 5, 1982, abandoned. This application Oct. 31, 1984, Ser. No. 667,055
Claims priority, application Japan, Jan. 12, 1981, 56-2830
Int. Cl.[4] F16B *25/00*
U.S. Cl. 411—387 5 Claims

1. A drilling screw having a central axis, a driving head on one end, a drilling tip on the other end, a threaded shank, and a drill section extending axially from the shank toward the tip comprising:
at least two axially extending, substantially radially directed flat walls lying in substantially the same plane on opposite sides of the central axis;
at least two axially extending straight cutting edges parallel to the central axis provided at the outer edges of said flat walls;
at least two inclined cutting edges inclined to the central axis extending from said parallel edges and terminating at a common point, said inclined cutting edges lying in the same plane as said radially directed walls;
a tip end formed at the termination of said inclined edges providing a predetermined tip angle;
at least two inclined flat relief faces extending from said tip

end and adjoining said flat axially extending walls at said inclined edges;

at least two first longitudinal flat inclined faces inclined from and adjoining said axially extending flat walls at said parallel edges, and each adjoining one of said relief faces at a respective common edge;

at least two second longitudinal flat inclined faces each extending from said tip end and adjoining a respective one of said axially extending walls to form at least two V-shaped flutes extending from said tip end toward said shank, and each second inclined face adjoining a respective one of said relief faces at a respective common edge extending from said tip end;

at least two third longitudinal flat inclined faces each positioned between respective ones of said first and second inclined faces and adjoining each of said first and second inclined faces at respective common edges, and each adjoining one of said relief faces at a respective common edge disposed between said tip end and said shank; and

at least two protruding reinforcing blocks formed by said longitudinal inclined flat faces, said relief faces and said axially extending flat walls.

4,586,863

APPARATUS FOR SHAPING AN METALLIC PULL RING AND SIMULTANEOUSLY CONNECTING IT TO A CONTAINER CLOSURE

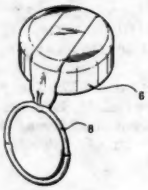
Kenji Morimoto, Tokyo; Tamotsu Ikegami, Yokohama; Masao Naito, Kanagawa; Tateo Kubo, Hiratsuka, and Shinichi Kizawa, Yokohama, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

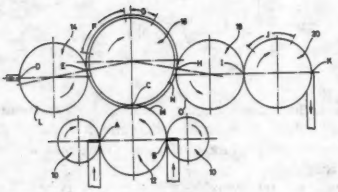
Filed Apr. 12, 1984, Ser. No. 599,666

Claims priority, application Japan, Apr. 15, 1983, 58-65285; Apr. 15, 1983, 58-65286; Apr. 15, 1983, 58-65287; Apr. 15, 1983, 58-65288; Apr. 15, 1983, 58-652289; Apr. 15, 1983, 58-65290; Apr. 15, 1983, 58-65291

Int. Cl.[4] B21D *51/44*

U.S. Cl. 413—14 **21 Claims**





1. An apparatus for shaping a metallic pull ring and simultaneously connecting it to a container closure comprising:

a rotary pull ring shaping and connecting means for curling the peripheral edge of the pre-shaped article in the radial direction to form it into a ring and simultaneously rolling a tear-off tab of the closure into said ring and connecting them to each other said pull ring shaping and connecting means comprising a pre-shaped article receiving zone, a closure receiving zone, a rolling zone comprising a bending zone and a pull ring shaping and connecting zone, and a discharge zone; at least one rotary pre-shaped article forming means for shearing a rectangular metal blank from the end portion of a thin metal strip and simultaneously bending it to form an annular pre-shaped article having overlapped opposite ends, said forming means comprising a rotary shearing blade; a rotary pre-shaped article feed means positioned intermediate and adjacent said pull ring shaping and connecting means and said pre-shaped article forming means for rotary transfer of said article from said at least one rotary pre-shaped article forming means to said pre-shaped article receiving zone of said rotary pull ring shaping and connecting means; and a rotary closure feed means positioned adjacent said pull ring shaping and connecting means for rotary transfer of said closure to said closure receiving zone of said pull ring shaping and connecting means and for positioning of said closure and said preshaped article at said closure receiving zone such that the free end portion of a tear-off tab of the closure and a part of the pre-shaped article overlap each other.

4,586,864

SUPPORT DEVICE FOR CHECKING AND REPAIRING A HEAVY ROTATABLE OBJECT

Yutaka Muraguchi, Nogata; Katsusuke Yoshida, and Shoichi Shiraishi, both of Fukuoka, all of Japan, assignors to Hoko Sangyo Co., Ltd., Fukuoka, Japan

Continuation of Ser. No. 494,780, May 16, 1983, abandoned. This application Apr. 1, 1985, Ser. No. 718,174

Claims priority, application Japan, May 21, 1982, 57-75641

Int. Cl.[4] B65G *70/00*

U.S. Cl. 414—433 **11 Claims**

1. A support device for a heavy rotatable object having a shaft adapted for checking and repairing the rotatable object, comprising:

a base frame situated on a floor,

a roller support base pivotally mounted on said base frame,

a partially spherical support mechanism interposed between said base frame and said roller support base so that said roller support base can be tilted in any direction relative to the base frame around the partially spherical support mechanism,

a pair of support rollers rotationally situated on said roller support base, said support rollers being spaced apart parallel to each other so that one end of the shaft of the rotatable object is rotationally retained and supported by said support rollers,

a drive mechanism operationally connected to said support rollers, said drive mechanism, when the rotatable object is checked, being operated to actuate the support rollers to thereby rotate the rotatable object, and

means for adjusting a lateral position of the roller support base relative to the base frame around the partially spherical support mechanism so that when the rotatable object is moved in an axial direction while rotating the support rollers for checking the rotatable object, the lateral position of the roller support base relative to the base frame is adjusted to thereby stop axial movement of the rotatable object, the axial movement of the rotatable object over the support rollers occurring when longitudinal axes of the support rollers and a longitudinal axis of the shaft of the rotatable object become non-parallel to each other at the

time of effecting rotation of the rotatable object by the support rollers, even though the longitudinal axes of the support rollers and the longitudinal axis of the shaft of the rotatable object are substantially parallel to each other when the shaft of the rotatable object is placed on the support rollers under a non-rotatable condition.

4,586,865

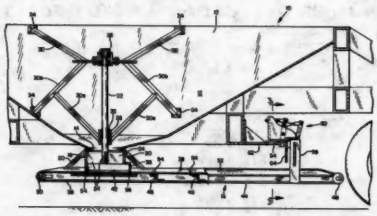
ROTATABLE DISCHARGE CONVEYOR FOR A BELLY-DUMP TRAILER

John C. Hansen, 6765 SW. Norse Hall Rd., Tualatin, Oreg. 97062

Continuation of Ser. No. 448,229, Dec. 9, 1982, abandoned. This application Mar. 11, 1985, Ser. No. 710,933

Int. Cl.[4] B60P *1/36*

U.S. Cl. 414—519 **8 Claims**



1. A bulk material discharge apparatus adapted to be operatively carried on a vehicle of the type having a material hopper and a lower discharge port, for selectively discharging bulk material from said port in any of a plurality of alternative directions with respect to said vehicle, said apparatus comprising:

(a) a material feed joint for receiving material from said discharge port, said feed joint including a tubular housing having an open top communicating with said discharge port and an open bottom;

(b) support means adapted to be rigidly attached to said vehicle for mounting said feed joint to said vehicle;

(c) elongate conveyor means rigidly mounted to said tubular housing for receiving material from said tubular housing and selectively discharging material in any of said alternative directions;

(d) said support means further including an elongate vertically-oriented shaft having two ends and being journaled with respect to said support means adjacent each of said ends, said shaft being connected to said feed joint and serving as means for rotatably supporting said feed joint and said conveyor means with respect to said support means; and

(e) said feed joint including elongate means oriented substantially longitudinally with respect to said shaft, rigidly connecting said shaft to said tubular housing for allowing the passage of material between said top and said bottom of said housing while also providing both vertical and cantilever support to said conveyor means and said feed joint from said shaft.

4,586,866

AUTOMOBILE TOWING APPARATUS

Rolf Kvamme, Aurora, Canada, assignor to Mobi-Jack Inc., Aurora, Canada

Filed Jun. 26, 1984, Ser. No. 624,840

Claims priority, application Canada, Jul. 15, 1983, 432526

Int. Cl.[4] B60P *3/12*

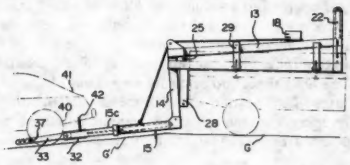
U.S. Cl. 414—563 **13 Claims**

1. Automobile towing apparatus for mounting on a tow truck, said apparatus comprising

(a) a pair of vehicle lifts adapted to engage and lift transversely spaced apart portions of a disabled vehicle, each lift defining a plane,

(b) a boom having an upper horizontal portion for extending rearwardly along the tow truck from a first transverse pivot axis at a forward location to a second transverse pivot axis at a more rearward location, said boom further having a lower horizontal portion for projecting rearwardly from the tow truck,

(c) means supporting the vehicle lifts in a horizontal loading position on said lower portion of the boom at transversely spaced apart locations adjacent the ground with their planes generally parallel with the ground,



(d) means for vertically moving each of said first and second axes independently of each other relative to the tow truck whereby upward movement of the second axis causes pivoting of the boom about the first axis to bring the lower portion of the boom to an elevated position in which the vehicle lifts are elevated above the ground and the disabled vehicle is raised to a towing position and upward movement of the first axis causes pivoting of the boom about the second axis to bring the lower portion of the boom to a down-sloped loading position in which the vehicle lifts lie closely adjacent ground that slopes rearwardly and downwardly away from the ground on which the tow truck stands with the planes of said vehicle lifts extending generally parallel to such sloping ground.

4,586,867

CONNECTION DEVICES

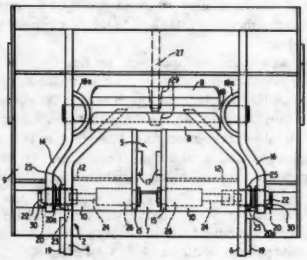
Raymond Stafford, Wigan, Great Britain, assignor to Dobson Park Industries Plc, Nottingham, Great Britain

Filed Dec. 27, 1983, Ser. No. 565,419

Claims priority, application United Kingdom, Dec. 24, 1982, 8236781

Int. Cl.[4] B25G *3/18*; B66C *23/00*

U.S. Cl. 414—723 **11 Claims**



1. A releasable connection device for coupling an accessory having a top, a bottom and a back to a vehicle, comprising a first mounting assembly for connection to the vehicle and a second mounting assembly for mounting to the accessory, said second mounting assembly comprising an enlongated mounting member attached to the accessory and extending generally horizontally across at least the major portion of the back thereof, and a first securing means mounted on the accessory

closer to the bottom thereof than said elongated mounting member, said first mounting assembly comprising an elongated channel means for receiving and supporting said elongated mounting member and extending across at least a major portion thereof, second securing means for engaging said first securing means for retaining said elongated mounting member in said channel member and for selectively being disengaged from said first securing means to enable the elongated mounting member to be disengaged from the channel member, and vehicle mounting means for pivotably mounting said first mounting assembly to the vehicle, said vehicle mounting means, said second securing means and said channel means each having an axis, the axes being such that when the accessory is coupled to a vehicle the channel means axis is closer to the accessory top than the axes of the second securing means and the vehicle mounting means, and the axis of the vehicle mounting means is closer to the bottom of the accessory then the axes of the second securing means and the channel means, the axes of the second securing means and the channel means defining a plane, the axis of the vehicle mounting means being displaced from said plane in a direction away from said vehicle.

4,586,868

WRIST MECHANISM OF AN INDUSTRIAL ROBOT

Seiichiro Nakashima, Hino; Shigemi Inagaki, Kokubunji, and Susumu Ito, Hino, all of Japan, assignors to Fanuc, Ltd., Tokyo, Japan

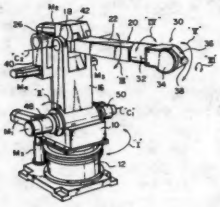
PCT No. PCT/JP83/00368, § 371 Date Jun. 19, 1984, § 102(e) Date Jun. 19, 1984, PCT Pub. No. WO84/01539, PCT Pub. Date Apr. 26, 1984

PCT Filed Oct. 20, 1983, Ser. No. 624,508

Claims priority, application Japan, Oct. 20, 1982, 57-182930

Int. Cl.[4] B66C *1/00*

U.S. Cl. 414—735 **6 Claims**



1. A wrist mechanism of an industrial robot comprising:

an outer wrist member attached to a robot arm of said industrial robot;

an inner wrist member disposed within and supported by said outer wrist member for tilting motion about a first axis extending laterally through said outer wrist member;

a first motion transmitting mechanism mounted on said outer wrist member and connected between a first rotative force input means and said inner wrist member to impart a tilting motion to said inner wrist member about said first axis;

a hand holding part supported in said inner wrist member for rotational movement about a second axis extending substantially perpendicular to said first axis;

a bevel gear mechanism for driving said hand holding part comprising a first bevel gear mounted on said inner wrist member for rotation about said first axis and a second bevel gear meshed with said first bevel gear and fixed to said hand holding part for rotation about said second axis;

a second motion transmitting mechanism mounted on said outer wrist member and connected between a second rotative force input means and said first bevel gear to impart rotary motion thereto for causing said bevel gear mechanism to drive said hand holding part in a swivel motion about said second axis; and

first overtravel detecting means arranged within said outer wrist member coaxially with said first axis and connected between said outer wrist member and said inner wrist member for detecting overtravel of said tilting motion of said inner wrist member, and second overtravel detecting means arranged within said outer wrist member coaxially with said first axis and connected between said outer wrist member and said bevel gear mechanism for detecting overtravel of said swivel motion of said hand holding part.

4,586,869

INDUSTRIAL ROBOT HAND

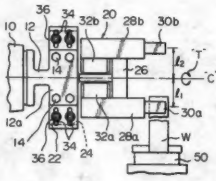
Ryo Nihei, Musashino, Japan, assignor to Fanuc, Ltd., Tokyo, Japan

PCT No. PCT/JP82/00335, § 371 Date Apr. 25, 1983, § 102(e) Date Apr. 25, 1983, PCT Pub. No. WO83/00651, PCT Pub. Date Mar. 3, 1983

PCT Filed Aug. 25, 1982, Ser. No. 491,199

Int. Cl.[4] B25J *17/02*

U.S. Cl. 414—736 **4 Claims**



1. An industrial robot hand adapted to be joined to the free end of a robot wrist unit, said free end having an axis of rotation, said hand comprising:

a hand base having a center axis parallel to said axis of rotation and left and right sides, relative to said center axis,

left and right work gripping units disposed separately, respectively on said left and right sides of said band base for gripping unmachined and machined workpieces, respectively, different in size and shape from one another, each gripping unit having a pair of work gripping swing fingers, and

means for fastening said hand base to said free end including an offset adjusting means for adjusting and laterally offsetting said center axis of said hand base relative to said axis of rotation of said free end.

4,586,870

METHOD AND APPARATUS FOR REGULATING POWER CONSUMPTION WHILE CONTROLLING SURGE IN A CENTRIFUGAL COMPRESSOR

William C. Hohlweg, Pittsburgh, and Edward Condrac, North Huntingdon, both of Pa., assignors to Elliott Turbomachinery Co., Inc., Jeannette, Pa.

Filed May 11, 1984, Ser. No. 609,901

Int. Cl.[4] F04D *27/02*

U.S. Cl. 415—1 **11 Claims**

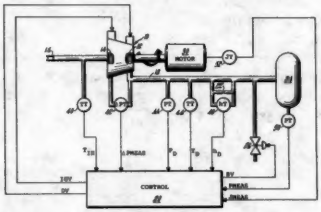
1. A method of maintaining surge control in a centrifugal compressor having an inlet, a discharge and inlet guide vanes, and a blow-off valve connected to the compressor discharge which comprises the steps of:

determining the mass flow rate of the working fluid flowing through the compressor;

calculating a bias factor based on the temperature of the working fluid at the compressor inlet;

ascertaining a set point for surge control based upon a desired pressure change between the compressor inlet and

discharge, said set point being based on the sum of the mass flow rate multiplied by a factor and the bias factor; measuring the pressure change between the compressor inlet and discharge; and



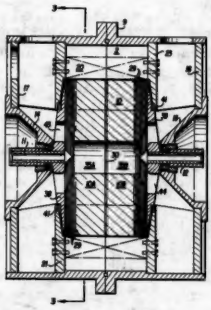
energizing the blow-off valve to maintain surge control in response to the measured pressure change exceeding the pressure change set point.

4,586,871

SHAFTLESS TURBINE

Benjamin G. Glass, 3011 Stockett Way, San Diego, Calif. 92117

Filed Sep. 22, 1980, Ser. No. 188,988
Int. Cl.[4] F01D *1/36*
U.S. Cl. 415—90 10 Claims



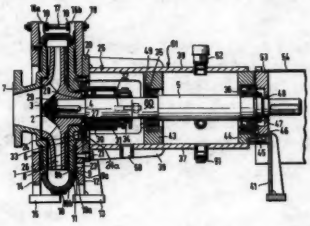
1. A turbine including a casing and a rotor journalled for rotation in said casing, said rotor being circular and fitted within the casing to leave a plenum around the outer rotor circumference, fluid entry means into said plenum and nozzle means located adjacent said outer circumference, said rotor comprising a pack of spaced-apart discs that define fluid entry means in said circumference, central exhaust holes in said discs that form unobstructed fluid exhaust exits at opposite sides of said rotor, said pack comprising two portions that are separated by a central solid disc that divides the flowing fluid into two oppositely flowing exhaust streams, said pack portions being connected to respective drive shafts at opposite sides of said casing.

4,586,872

CENTRIFUGAL PUMP

Rolf Corzilius, Dortmund; Horst-Guenter Noack, Maria-Veen, and Johann Stollbrink, Lembeck, all of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Dec. 7, 1983, Ser. No. 558,838
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1982, 3247937; Sep. 26, 1983, 3334786
Int. Cl.[4] F04D *29/42*
U.S. Cl. 415—219 C 24 Claims



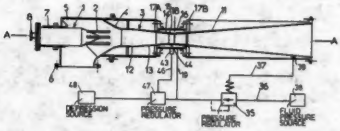
1. A centrifugal pump, comprising:
a rotor mounted on a rotor shaft;
roller bearing means for supporting said shaft;
a bearing flange housing surrounding the shaft and containing the rolling bearings therein supporting the shaft;
a spiral housing for the rotor which, together with parallel wear walls radially abutting the spiral housing, enclose the rotor;
a two-piece enclosure for the spiral housing and wear walls comprising inlet side and back-side retaining plates;
means for pulling the retaining plates toward one another so as to create a clamping action to retain the parallel wear walls and spiral housing in bolt-free connecting abutment with one another;
said back-side retaining plate having an inside aperture, and a shaft protection sleeve surrounding the shaft and positioned in said aperture;
said bearing flange housing having an end flange and an aperture in said end flange; and
said shaft protection sleeve having means for aligning said back-side retaining plate with said bearing flange by an abutting cooperation with an inside edge wall of the apertures of the end flange and back-side retaining plate.

4,586,873

MIXER-EJECTOR WITH JET EFFECT AND VARIABLE CROSS-SECTION

Marc V. A. Lepretre, Bois-Colombes; Lucien D. Balzano, Jouars Ponchartrain, and Michel R. Caillault, Orgerus, all of France, assignors to BERTIN & Cie, Plaisir, France

Filed Nov. 9, 1984, Ser. No. 669,861
Claims priority, application France, Nov. 10, 1983, 83 17869
Int. Cl.[4] F04F *5/48*
U.S. Cl. 417—54 4 Claims



1. Process for employing a mixer-ejector with jet effect of the type incorporating at least one inductor nozzle opening into a venturi conduit incorporating, in succession, a highly

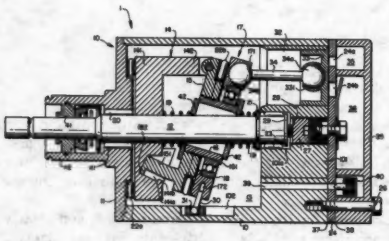
convergent suction sleeve, in contact with a hollow body which can be coupled to a pipeline conveying an induced flow, an intermediate, variable-profile venturi part consisting of a sleeve made of distortable elastic material housed with leak-tight sealing in a casing which forms with the sleeve an enclosure surrounding the latter, and a diffuser which can be coupled to a user device, wherein the improvement comprising, in the operation of the mixer-ejector, the steps of subjecting the elastic sleeve to a tensile prestressing by stretching its body in a direction parallel to the axis of said sleeve before applying to the enclosure a pressure higher than in said venturi conduit to impart to said body the desired venturi profile.

4,586,874

REFRIGERANT COMPRESSOR WITH A CAPACITY ADJUSTING MECHANISM

Masaharu Hiraga, Honjo, and Tamotsu Daikohara, Gunma, both of Japan, assignors to Sanden Corporation, Japan

Filed Dec. 21, 1984, Ser. No. 684,577
Claims priority, application Japan, Dec. 23, 1983, 58-242128
Int. Cl.[4] F04B *1/26*
U.S. Cl. 417—222 **6 Claims**



1. In a refrigerant compressor including a compressor housing having a cylinder block provided with a plurality of cylinders and a crank chamber adjacent said cylinder block, a piston slidably fitted within each of said cylinders and reciprocated by a drive mechanism including a wobble plate, an input drive rotor and a drive shaft connected to said input drive rotor to drive said input drive rotor, a front end plate on said compressor housing including a bearing for rotatably supporting said drive shaft and a rear end plate disposed on the opposite end of said compressor housing having a suction chamber and a discharge chamber, the improvement comprising a slant plate mounted on said input drive rotor, said slant plate having a sloping surface at a slant angle in close proximity to said wobble plate; slant angle limiting means associated with said slant plate for limiting the adjustment of the slant angle of said sloping surface within a predetermined range; and slant angle control means for controlling the slant angle of said sloping surface in response to pressure differences between said crank chamber and said suction chamber.

4,586,875

REFRIGERANT COMPRESSOR BYPASS OIL FILTER SYSTEM

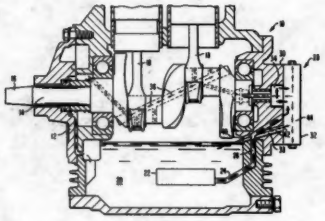
Robert C. Aman, Jr., Minneapolis, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed Jun. 6, 1985, Ser. No. 742,159
Int. Cl.[4] F04B *39/02*; F01M *1/10*; B01D *29/00*
U.S. Cl. 417—228 **3 Claims**

1. A refrigerant compressor and oil circulating and cleaning system comprising:

a refrigerant compressor of the type having a crank case with a crank shaft, a pressurized lubrication system through said crank shaft, an oil sump in said crank case, and an oil pump in a housing at one end of and driven by said crank shaft, with the oil pump housing having first and second bores opening from external of said housing to the high pressure side of said pump, an oil leak passage having an inlet connected to said first bore and extending into said compressor to an outlet at least below the space of crank shaft turbulence in said crank case, said first bore being adapted to selectively receive a first pressure regulator with an end cap to close said bore externally, said second bore being adapted to be closed selectively at its external end by plug means;

a second pressure regulator, having a high pressure side and a low pressure side, inserted in said first bore in place of said first pressure regulator, said low pressure side being open to external of said oil pump;



an external oil filter having a relatively high resistance to oil flow between its inlet and outlet as compared to the resistance to oil flow of said pressurized lubrication system of said compressor;

first conduit means connecting said second bore to said filter inlet in the absence of said plug means;

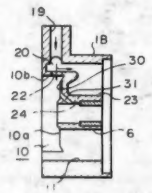
second conduit means connecting the lower pressure side of said second pressure regulator to said filter outlet to place the return flow from said filter in communication with said low pressure side of a second pressure regulator, so that oil taken from the high pressure side of said pump and passed through said filter is returned to the low pressure side of said regulator and through said oil leak passage to said sump.

4,586,876

INCLINED DISC TYPE FLUID COMPRESSOR

Yoshio Kato; Toshihiro Nagamathu; Kazufumi Tsurumi, all of Toyota; Shozo Nakayama, and Kimio Kato, both of Kariya, all of Japan, assignors to Taiho Kogyo Co., Ltd., Aichi, Japan

Continuation of Ser. No. 393,443, Jun. 29, 1982, abandoned.
This application Aug. 16, 1985, Ser. No. 766,670
Claims priority, application Japan, Jun. 11, 1982, 57-99336
Int. Cl.[4] F04B *1/16, 1/18*
U.S. Cl. 417—269 **10 Claims**



1. An inclined disk type compressor comprising: a cylinder block; a driving shaft rotatably mounted in said cylinder block by means of thrust bearings and radial bearings; a disk rigidly secured to said driving shaft at a certain inclined angle with respect to the axis of said driving shaft; said cylinder block having a chamber for accommodating said inclined disk so as to allow the rotation of the latter; said cylinder block having cylinder bores which are arranged in parallel to the axis of said

driving shaft; the opposite ends of each said cylinder bore being communicated with a suction passage and a discharge passage via a suction valve and a discharge valve, respectively; compressor pistons slidingly disposed in said cylinder bores so that gaseous fluid containing lubrication oil is compressed in said cylinder bores by said pistons; shoe means for operatively connecting the peripheral portion of said inclined disk to said compressor pistons so as to cause the reciprocal movement of said compressor pistons upon the rotation of said inclined disk; said radial bearings being sliding radial bearings arranged at positions apart from said chamber which is communicated with said suction passage so that at least a part of the gaseous fluid containing lubrication oil is introduced into said chamber and then introduced into said cylinder bores after having been passed through said chamber; said chamber being provided on the opposite axial internal end walls with grooves for receiving lubrication oil flowing down along internal end surfaces; and said radial bearings being communicated with said grooves through oil passages which are bored in the cylinder block so as to be open to said grooves and introduce the lubrication oil to said radial bearings.

4,586,877

ELECTRIC FUEL PUMP DEVICE

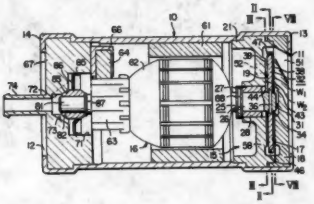
Kiyohiko Watanabe, Chiryu; Yoshiyuki Hattori, Toyoake; Kazuma Matsui, Toyohashi; Toshihiro Takei, Kariya; Toshiaki Nakamura, Anjo, and Syunsaku Ohnishi, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

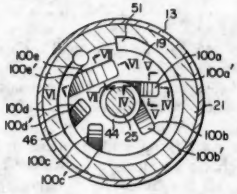
Continuation of Ser. No. 405,579, Aug. 5, 1982, abandoned. This application Jan. 18, 1985, Ser. No. 692,867

Claims priority, application Japan, Aug. 11, 1981, 56-125454

Int. Cl.[4] F04B *17/00*; F01D *3/00*

U.S. Cl. 417—365 **12 Claims**





1. An electric fuel pump having a regenerative pump section and an electric motor section for driving said regenerative pump section, wherein said regenerative pump section includes:

a pump casing having a suction and a discharge port;

a first inner surface and a second inner surface which are opposing to each other and spaced axially from each other to form therebetween a pump chamber;

a substantially annular pump passage surrounding said first and second inner surfaces and connected at its ends with said suction and discharge ports, respectively; and

an impeller accommodated by said pump chamber and mounted on a rotor shaft for rotation as unit therewith but axially movably relatively thereto,

said impeller having one axial end surface opposing to said first inner surface of said pump casing with a first gap left therebetween and another axial end surface opposing to said second inner surface of said pump casing with a second gap left therebetween,

said first inner surface and said second inner surface of said pump casing being provided with at least one axial thrust force generating surface which is so shaped as to gradually decrease said first gap and said second gap towards the downstream sides as viewed in a direction of flow of fuel introduced into said gaps, respectively,

one end of said axial thrust force generating suffface terminating at said pump passage adjacent to said discharge port, so that the fuel may flow from said pump passage in a direction to said suction port along said axial thrust force generating surface

thereby to minimize the chance of contact between said impeller and said first inner surface and a said second inner surface of said pump casing during a running of said impeller.

4,586,878

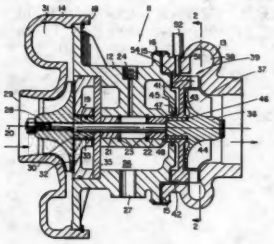
ACCELERATING MEANS AND METHOD FOR TURBOCHARGER

Eugene S. Witchger, 210 W. 77th St., Indianapolis, Ind. 46260

Filed Jul. 20, 1984, Ser. No. 633,015

Int. Cl.[4] F04B *17/00*; F01B *25/02*; F03B *1/04*

U.S. Cl. 417—407 **3 Claims**



1. A turbocharger comprising:

a housing having an engine exhaust input;

shaft means having a longitudinal axis and rotatable in said housing on said axis;

a compressor wheel and turbine wheel secrued to said shaft means, said turbine wheel being in communication with said exhaust whereby the compressor wheel is driven by the turbine wheel on said axis;

nozzle ring means rotatably mounted in said housing for rotation on an axis, said nozzle ring means having a plurality of vanes disposed in the exhaust gas flow path from the exhaust input of said housing means to said turbine wheel; and

brake means on said housing and operable, when actuated, to inhibit rotation of said nozzle ring means.

4,586,879

WELL PUMPING UNIT

Frank W. Slater, P.O. Box 186, Durant, Okla. 74701

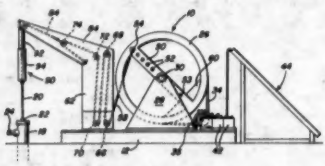
Filed Mar. 19, 1984, Ser. No. 591,335

Int. Cl.[4] F04B *17/00*; F16C *1/10*

U.S. Cl. 417—411 **14 Claims**

1. A pump operating unit for reciprocating a pump component operably connected to an output member of the pump operating unit which moves in a reciprocating manner, said pump operating unit comprising a large diameter wheel, a

power unit having a small diameter output pulley, a belt encircling the small diameter pulley and large diameter wheel for driving the wheel at a slow rotational speed as compared to the rotational speed of the pulley, an actuating cable, means attaching one end of the cable eccentrically to the large diameter wheel, the other end of the cable being anchored and the



intermediate portion of the cable passing over a plurality of pulleys, support means for the wheel, cable pulleys and anchor point for the cable, a traveling pulley engaging a portion of the cable, second cable means forming the output member connected to the traveling pulley and a head pulley supporting the second cable means.

4,586,880

SUBMERSIBLE MOTOR AND PUMP ASSEMBLY

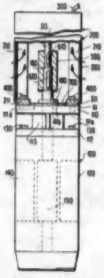
Hiroshi Inao, and Mitsuhiro Nishida, both of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 30, 1984, Ser. No. 605,543

Claims priority, application Japan, Apr. 29, 1983, 58-76726; Apr. 29, 1983, 58-76727; Apr. 29, 1983, 58-76728; May 17, 1983, 58-74752; Jul. 11, 1983, 58-108420; Jul. 11, 1983, 58-108419

Int. Cl.[4] F04B *17/00*

U.S. Cl. 417—424 **11 Claims**



1. A submersible pump assembly for pumping liquids having particles suspended therein including an underlying motor having a rotor and a stator surrounding said rotor, said rotor having a shaft extending axially therefrom and said assembly further comprising an overlying pump, said motor comprising:

a motor frame concentrically enclosing said rotor and stator;

a bracket connected to the upper end of said motor frame;

a hole within said bracket;

said shaft of said motor extending through said bracket hole and engaging said pump to drive said pump;

sealing means between said rotor shaft and said bracket for preventing liquid from entering said motor frame along said shaft;

said pump including a suction frame, said suction frame being connected to said bracket;

guide means disposed between said bracket and said suction frame for guiding undesirable small particles suspended in said liquid falling onto said bracket away from the area of said shaft;

a collar fixedly mounted to said shaft over said sealing means and spaced axially therefrom;

said guide means comprising at least one of a groove and an aperture;

said at least one groove or aperture extending to the outer circumference of the pump assembly so as to carry undesirable particles outside the pump assembly;

said bracket comprising a first flange portion, and a second flange portion spaced apart from said first flange portion;

said suction frame being connected to said first flange portion and extending axially upwardly therefrom;

whereby, said collar causes a spiral liquid flow outwardly of said collar and through said at least one groove or aperture.

4,586,881

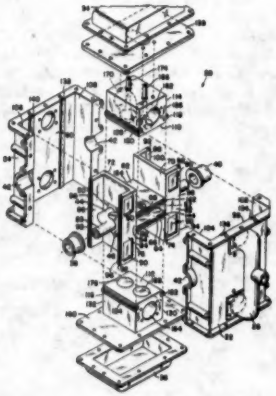
MACHINE HAVING INTEGRAL PISTON AND CYLINDER WALL SECTIONS

Craig S. Beshore, 753 Puma Canyon La., Glendora, Calif. 91740

Filed Feb. 28, 1983, Ser. No. 470,582

Int. Cl.[4] F04B *19/02*; F02B *59/00*

U.S. Cl. 417—460 **20 Claims**



1. A machine having at least a first working chamber formed by:

a machine case with:

first and second stationary sidewall surfaces facing each other; and

a first head surface extending between said first and second stationary sidewall surfaces; and

a reciprocating piston having:

a first top surface facing said first head surface; and

first and second reciprocating sidewall surfaces extending between said first and second stationary sidewall surfaces and between said first top surface and said first head surface.

4,586,882

TUBING OCCLUDER PUMP

Charles C. Tseng, Lake Bluff, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Dec. 6, 1984, Ser. No. 678,910

Int. Cl.[4] F04B *43/12, 45/08*

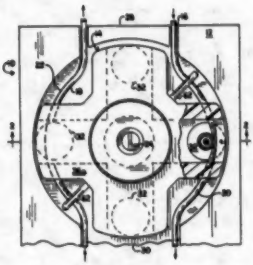
U.S. Cl. 417—477 **23 Claims**

1. In a tubing occluder pump where fluid is pumped by the periodic occlusion of transverse sections of flexible tubing along a length thereof, the improvement comprising:

means for occluding the tubing between a recessed first

occluding surface means and a projecting second occluding surface means;

said recessed first occluding surface means defining a transverse cross section at the areas of contact with said transverse sections of the tubing during occlusion, said transverse cross section of said first recessed occluding surface means having a slightly concave mid-portion, at each end of said slightly concave mid-portion, a sloped, straight portion, each sloped, straight portion forming an angle at the inersection with said slightly concave mid-portion of between about 120° and 150° and a concave side defining an indentation in said first occluding cross section at the end of each sloped, straight portion opposite the end at said slightly concave mid-portion;



said projecting second occluding surface means defining a wedge-shaped transverse cross section at the areas of contact with said transverse sections of said tubing during occlusion, said cross section of said second occluding surface means having a straight mid-portion of a length substantially equal to the length of said slightly concave mid-portion for urging a transverse portion of tubing against the slightly concave mid-portion cross section of said recessed first occluding surface means and a straight side portion extending from said straight mid-portion at each end of said straight mid-portion and forming an angle with the intersection of said straight mid-portion of between about 225° and 270° for urging transverse ends of the transverse portion of the tubing against the sloped and concave side portions of said recessed first occluding surface means.

4,586,883

DIAPHRAGM PUMP OR MOTOR DEVICE

Leslie Sumner, Bath, England, assignor to Gallaher Limited, London, England

Continuation-in-part of Ser. No. 468,488, Feb. 22, 1983, abandoned, which is a continuation of Ser. No. 211,244, Nov. 28, 1980, abandoned. This application Mar. 5, 1985, Ser. No. 708,539

Int. Cl.⁴ F04B *43/12*

U.S. Cl. 417—477 **7 Claims**

1. A diaphragm pump or motor device comprising, in combination:

(a) a first housing part;

(b) an internal surface on said first housing part;

(c) a first peripheral clamping surface on said first housing part surrounding said internal surface and facing substantially in the same direction as said internal surface;

(d) a flexible diaphragm which is substantially longitudinally inextensible and having a chamber-forming surface overlying said internal surface and said peripheral clamping surface, said chamber forming surface of said diaphragm forming with said internal surface a chamber;

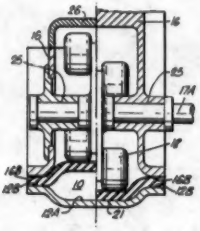
(e) a second housing part;

(f) a second peripheral clamping surface on said second housing part shaped to overlie that part of the diaphragm overlying the first peripheral clamping surface, effective to clamp longitudinal and end edges of said diaphragm sealingly against said first peripheral clamping surface;

(g) two longitudinally extending corrugations spaced from the longitudinal edges of the diaphragm, said corrugations facilitating movement of the portion of the diaphragm between said corrugations with respect to the clamped longitudinal edges of said diaphragm;

(h) first and second ports in said first housing part communicating with spaced portions of said diaphragm in the vicinity of clamped end edges of said diaphragm; and

(i) at least three deflector means movable longitudinally of



the diaphragm sequentially on the face of said diaphragm remote from said chamber forming surface, effective to urge the diaphragm against or towards said internal surface, to form a closure or constriction which traverses the chamber and to move the closure or constriction from one port to the other port, one such closure or constriction being terminated after the succeeding closure or constriction is initiated, the configuration of the pump or motor device being such that, at said at least three deflector means move sequentially along a path on said face of the diaphragm remote from the chamber, the sum of distances measured along the diaphragm between the clamped end edges of the diaphragm remains substantially constant.

4,586,884

PNEUMATIC POWER TOOL WITH SPEED GOVERNOR

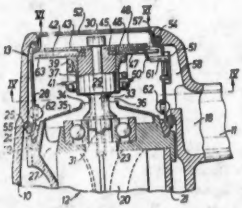
Karl G. Berger, Saltsjö-Duvnäs, and Karl G. Kardén, Nacka, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Continuation of Ser. No. 648,347, Sep. 6, 1984, abandoned, which is a continuation of Ser. No. 436,627, Oct. 25, 1982, abandoned, which is a division of Ser. No. 434,179, Oct. 14, 1982, Pat. No. 4,465,443. This application Apr. 1, 1985, Ser. No. 718,197

Claims priority, application Sweden, Oct. 21, 1981, 8106210

Int. Cl.⁴ F01C *21/12*

U.S. Cl. 418—43 **10 Claims**



1. A pneumatic power tool comprising:

a housing;

a rotary vane motor located in said housing and including a rotor drivingly connected to an output spindle, said rotor

having a rear extension, and said vane motor having a rear end wall;

a pressure air supply passage in said housing communicating with said vane motor;

a speed governor including a tubular valve element supported on and axially movable relative to said rear extension of said rotor, and a speed responsive actuating means coupled to said valve element for moving said valve element at motor speeds above a certain level;

a passage forming means immovably associated with said rear end wall of said vane motor, said passage forming means forming a part of said air supply passage and including an air inlet opening concentrically disposed relative to said rotor;

said rear extension of said rotor extending through said air inlet opening of said passage forming means; and

said tubular valve element being located upstream of said passage forming means and being arranged to cooperate with said passage forming means to control the air flow through said air inlet opening.

4,586,885

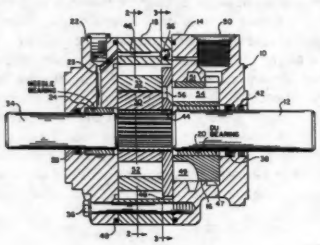
COMPACT HIGH TORQUE HYDRAULIC MOTORS

Carle A. Middlekauff, Cumberland, Me., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 473,367, Mar. 8, 1983, Pat. No. 4,501,536. This application Dec. 7, 1984, Ser. No. 679,315

Int. Cl.[4] F03C *2/00*

U.S. Cl. 418—61 B **2 Claims**



1. A motor for providing relatively high torque at relatively low speed at an output end of a shaft comprising:

a. a housing having an inlet and an outlet port for the entry and exit of fluid;

b. a shaft rotatable about a fixed axis having said output end extending from said housing;

c. first and second insert bearings for supporting said shaft, said first bearing located adjacent to said shaft's output end;

d. an inner toothed member mounted upon said shaft for central rotation about the longitudinal fixed axis of said shaft, said inner member being disposed between said bearings and wherein the outer radial diameter of said first bearing is substantially smaller than the root diameter of said inner member;

e. an outer toothed member mounted within said housing for eccentric nonrotational orbital movement with respect to said fixed axis, said outer member defining with said inner member a plurality of circumferentially spaced chambers, the volume of individual chambers varying with rotation of the inner member;

f. commutator means positioned coaxially and co-planar to said first bearing, to direct fluid from said inlet and outlet ports to the chambers formed by the inner and outer members; and

g. rotatable valve means affixed to said shaft between said commutator means and said inner and outer members and rotatable with the shaft to control flow from the commutator to the chambers.

4,586,886

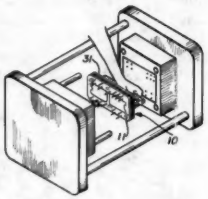
INSERT TRANSFER DEVICE AND METHOD

Joseph J. Prischak, Erie; William J. Vlcron, Fairview, and Carl E. Seaberg, Erie, all of Pa., assignors to Plastek Industries, Inc., Erie, Pa.

Filed Apr. 18, 1985, Ser. No. 718,351

Int. Cl.[4] B29C *6/00*; B29F *1/00*

U.S. Cl. 425—123 **11 Claims**



1. In combination, a device for transferring inserts into a mold and a mold having at least one insert receiving cavity, comprising:

a transfer plate having a mold face with at least one insert transfer channel aperture in it which opens into said insert receiving cavity in said mold,

an insert actuator means comprising an actuator plate, and a plate actuator means attached to said actuator plate,

said actuator plate having at least one actuator pin extending therefrom,

said actuator plate and said transfer plate being connected together so that each said actuator pin is substantially axially aligned with the central axis of each said insert transfer channel aperture,

said plate actuator means being adapted to move said actuator plate toward said transfer plate and thereby convey each said actuator pin at least partially through each corresponding said insert transfer channel aperture, whereby inserts received in said insert transfer channel apertures are moved from said insert transfer channel apertures into insert receiving cavities in said mold.

4,586,887

INJECTION MOLDING NOZZLE PROBE AND STACK MOLDING APPARATUS

Jobst U. Gellert, 7A Prince St., Georgetown, Ontario, Canada (L7G 2X1)

Filed Jun. 11, 1984, Ser. No. 619,784

Claims priority, application Canada, May 25, 1984, 455174

Int. Cl.[4] B29C *45/22*

U.S. Cl. 425—144 **4 Claims**

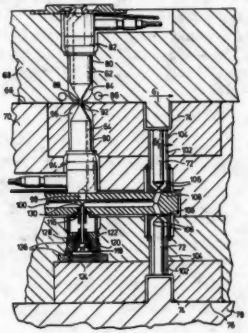
1. Stack injection molding apparatus for conducting melt from a fixed platen to a movable platen, where said platens are actuated according to an operating cycle between open and closed positions, comprising:

(a) a first heated elongated nozzle probe seated in the fixed platen, said first nozzle probe having a pointed tip in alignment with a first gate extending through the fixed platen, the first nozzle probe having at least one melt passage extending to convey pressurized melt from an inlet in said first nozzle probe to the first gate; and

(b) a second heated elongated nozzle probe seated in the movable platen, said second nozzle probe having a pointed tip in alignment with a second gate extending through the movable platen, the first gate through the fixed platen connecting with the second gate through the movable platen in the closed position, the second nozzle probe having at least one melt passage extending to convey pressurized melt from the second gate to a melt duct in the movable platen;

the first and second nozzle probes each having first and

second electrical heating elements extending longitudinally along the melt passage, the first heating element having a portion extending into the pointed tip of the respective nozzle probe and the second heating element terminating short of the pointed tip, including an electrical power source which is connected to energize only the



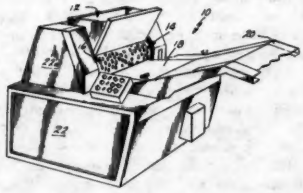
second heating element in the first nozzle probe and at least the first heating element in the second nozzle probe, whereby the pointed tip of the second nozzle probe is heated to a higher temperature than the pointed tip of the first nozzle probe to reduce stringing of the melt when the movable platen is actuated to the open position.

4,586,888

APPARATUS FOR SHAPING "SOFT" BAKING DOUGH AND THE LIKE BY ROTARY MOLDING APPARATUS

Joseph R. Anderson, Ada, Mich., assignor to Werner Lehara, Inc., Grand Rapids, Mich.

Filed Feb. 14, 1985, Ser. No. 701,547
Int. Cl.[4] B29C *3/02;* A21D *6/00*
U.S. Cl. 425—362 **51 Claims**



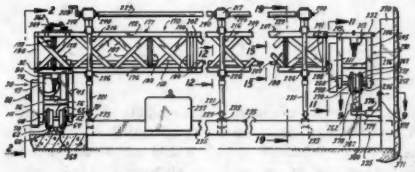
1. Rotary molding apparatus for producing a continuing sequence of shaped articles from "soft"-type baking doughs and like media, comprising in combination: a generally cylindrical rotary die roll having a plurality of molding cavities in its outer surface and a longitudinal axis of rotation; a supply hopper disposed generally above said die roll axis, for holding a quantity of "soft"-type media to be molded; a rotary feed roll communicating with the media in said hopper for feeding such media from the hopper to said die roll for shaping by the said cavities thereof; a take-off conveyor having a belt with a portion extending into complementary wrapping engagement with and along at least the lower extremities of said die roll, for receiving the shaped articles of soft media from the die roll cavities in which they are shaped and conveying the shaped articles away for further processing; and article-trapping retention means disposed adjacent an arcuate segment of the surface of said die roll located near and extending away from said feed roll in the direction of die roll rotation, for trapping the shaped media and retaining same in place within individual molding cavities of said die roll during rotation of the die roll by which such cavities are moved from the comparatively higher position near the feed roll to a lower position of the die roll nearer the point where said take-off conveyor receives the shaped media from the die roll molding cavities.

4,586,889

CONCRETE-FINISHING MACHINE

Albert W. Krohne, 506 Hanover St., Okawville, Ill. 62271, and Wallace Luebke, Okawville, Ill., assignors to Albert W. Krohne, Okawville, Ill.

Filed Sep. 1, 1983, Ser. No. 528,418
Int. Cl.[4] E01C *19/30*
U.S. Cl. 425—456 **3 Claims**



1. A surface-forming machine which comprises a bridge-like truss, wheel-equipped horses that are secured to said bridge-like truss adjacent the ends of said bridge-like truss to support and to move said bridge-like truss, a surface-engaging member, a plurality of adjustable supports which depend downwardly from said bridge-like truss to hold said surface-engaging member at different levels relative to said bridge-like truss to engage the surface of an area to be formed, means selectively disposing one of said horses at substantially the same level as the other of said horses to enable said horses to support and move said bridge-like truss while said horses are at said same level or displacing said one of said horses a substantial vertical distance from the level of said other of said horses to enable said horses to support and move said bridge-like truss while said horses are at substantially-vertically displaced levels, said means including points on said bridge-like truss which are generally at the same level and which are securable to said horses at generally the same distances above the wheels of said horses so said bridge-like truss can be supported and moved by said horses while it is generally horizontal and said horses are at the same level, said means including points on said bridge-like truss which are at different levels and which are securable to said horses at generally the same distances above said wheels of said horses so said bridge-like truss can be supported and moved by said horses while it is generally horizontal and said horses are at different levels, one of said horses being displaced vertically from the other of said horses whenever the space at just one side of said area is filled or obstructed and thereby causes the support for said horses to be at different levels, a supporting rail mounted above the level of said one side of said area to support said one of said horses while permitting said one of said horses to move longitudinally of said area, and horizontally-adjustable brackets secured to uprights to support said supporting rail, said horizontally-adjustable brackets spacing said supporting rail inwardly of the outer face of one of said horses to underlie the wheels of said horse and being horizontally adjustable to hold said supporting rail substantially straight even where said uprights are not in alignment.

4,586,890

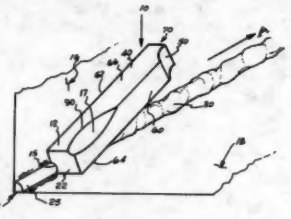
CAULK BEAD TOOL

Clandes Marchbanks, 7800 E. Jefferson, Apt. 1234, Detroit, Mich. 48214

Filed Apr. 24, 1985, Ser. No. 726,840
Int. Cl.[4] B29C *33/40, 67/00*
U.S. Cl. 425—458 **10 Claims**

1. A tool disposed for being supported by and drawn along

a joint formed by a pair of intersecting planar surfaces for finishing a bead of caulk freshly applied to said joint, said tool comprising a unitary, flexible, elongated body, said body formed of a resilient, compressible material containing first and second axially spaced operative ends; said first end defining means for contouring said bead of caulk, said means comprising a first concavity extending longitudinally along said elongated body from an axial extremity of said first end at least partially along one side thereof, and said second end defining means for removal of the excess caulk from said intersecting planar surfaces comprising a second concavity extending fully laterally across an axial extremity of said second end of said tool.



4,586,891

DEVICE FOR REMOVING AND CONVEYING INJECTION-MOLDED PIECE

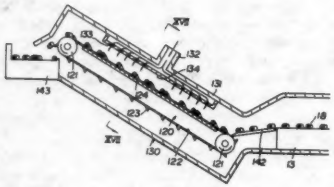
Yoshiyuki Ichizawa, Sohka; Tsugio Nomoto, Higashi Kurume, and Mamoru Oshida, Funabashi, all of Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Division of Ser. No. 32,970, Apr. 24, 1979, Pat. No. 4,514,166. This application Sep. 5, 1984, Ser. No. 647,542

Claims priority, application Japan, Apr. 24, 1978, 53-48573; Apr. 24, 1978, 53-48575; Apr. 24, 1978, 53-54350[U]

Int. Cl.[4] B29C *49/64*

U.S. Cl. 425—526 **4 Claims**



1. A device for cooling and conveying hot preforms for bottle-shaped containers of polyethylene terephthalate resin immediately after formation by injection molding, said device comprising:

an endless belt conveyor for continuously conveying preforms resting on an outer surface thereof;

a cover substantially enclosing said endless belt conveyor;

a cooling air inlet provided in said cover for introducing cooling air to cool the hot preforms on said conveyor to a predetermined temperature; and

a scattering plate between said inlet and said conveyor perforated with a number of vent holes for distributing the cooling air to a predetermined space between sid cover and said conveyor, wherein said vent holes are distributed on said scattering plate such that substantially none are disposed adjacent said cooling air inlet.

4,586,892

DEVICE FOR REMOVING AND CONVEYING INJECTION-MOLDED PIECE

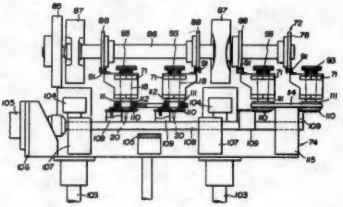
Yoshiyuki Ichizawa, Sohka; Tsugio Nomoto, Higashi Kurume, and Mamoru Oshida, Funabashi, all of Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Division of Ser. No. 32,970, Apr. 24, 1979, Pat. No. 4,514,166. This application Sep. 5, 1984, Ser. No. 647,541

Claims priority, application Japan, Apr. 24, 1978, 53-48573; Apr. 24, 1978, 53-48575; Apr. 24, 1978, 53-54350

Int. Cl.[4] B29C *17/12*; B26D *1/09, 7/10*

U.S. Cl. 425—531 **12 Claims**



1. A gate cutting device for receiving pieces integral with the gates from an injection molding machine horizontally in the same array as that of the injection molding machine, intermittently conveying the pieces, and cutting sequentially the gates from heads of the pieces, said device comprising:

piece conveying means comprising:

a number of piece holders intermittently movable at a predetermined moving interval for horizontally holding the pieces at a vertical interval corresponding to the intermittent movement interval of said piece holders, and

a stopper plate disposed adjacent the piece holders for restricting movement of the pieces held by the piece holder away from a cutting position for cutting the gates from the pieces; and

gate cutting means comprising:

piece head holders each comprising an end wall having a piece head inserting recess formed therein for receiving the head of a piece disposed at the cutting position and an opening formed therein through which said gates can project when held in said piece head holders, said piece head holders being longitudinally movable back and forth toward the pieces held by the piece holders at the cutting position, and

a cutter for cutting the gates projected from the piece head holders, said cutter comprising at least one blade mounted adjacent said wall movably in a direction perpendicular to the axes of the pieces held by the piece holders.

4,586,893

CONTROL APPARATUS

Michael J. Somerville; Ian F. Pollard, and William J. Walker, all of 25 North Street, Lewes, East Sussex, England (BN7 2PE)

Division of Ser. No. 446,990, Dec. 6, 1982, abandoned. This application Feb. 11, 1985, Ser. No. 699,741

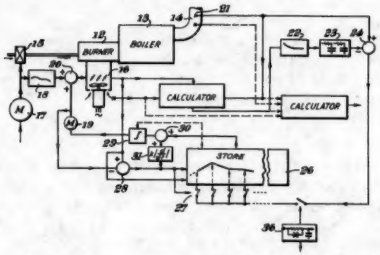
Claims priority, application United Kingdom, Dec. 8, 1981, 8137016; Aug. 10, 1982, 8222984

Int. Cl.[4] F23N *5/00*

U.S. Cl. 431—76 **13 Claims**

1. Combustion control apparatus for a burner having a motor-controlled fuel valve and motor-controlled means for adjusting the supply of air to said burner as the burn-rate is varied by said fuel valve, said apparatus comprising: means for measuring a characteristic of the flue gas of said burner; means for comparing the measured value of said characteristic with a

desired value and producing an error signal representing the difference between said measured value and said desired value; means for storing a plurality of control signals each representing a value of the air supply associated with a respective burn-rate and for continuously updating said control signals by varying them in dependence on said error signal in the direction necessary to reduce said error signal towards zero; means for continuously selecting the appropriate control signal in dependence on the instantaneous burn-rate; a mechanical profiler controlled by the motor operating the fuel valve and adapted to control a damper to effect a coarse variation of the air supply in dependence on the desired burn-rate; and apparatus controlled by said selected control signal adapted to trim the output of the mechanical profiler and thus to adjust the air supply in the direction necessary to reduce said error signal towards zero; wherein said means for storing comprises a



plurality of individual storage locations, each adapted to store a value of the trim position required for a particular value of burn-rate, said stored values being continuously updated by means of said error signal; wherein said means for selecting comprises a first selector adapted to apply proportions of said error signal to two adjacent storage locations in dependence on an output signal representing the output of said mechanical profiler, and a second selector adapted to supply proportions of the contents of two adjacent storage locations to said trim apparatus again in dependence on said output signal; wherein said output signal is constructed by subtracting a signal representing the output of the trim apparatus from a signal measuring the actual damper position; said combustion control apparatus further comprising means for calculating the burn-rate in dependence on said signal measuring the actual damper position, a signal measuring the oxygen content of the flue gas, and a signal measuring the inlet air temperature in the burner.

4,586,894

INDUSTRIAL BURNER FOR GASEOUS OR LIQUID FUELS

Joachim Wünning, Leonberg, Fed. Rep. of Germany, assignor to WS Wärmeprozesstechnik GmbH, Renningen, Fed. Rep. of Germany

Filed Jun. 12, 1985, Ser. No. 744,107

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1984, 3422229

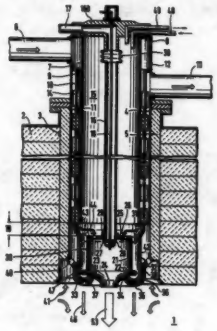
Int. Cl.[4] F23D *15/00*

U.S. Cl. 431—158 **22 Claims**

1. Industrial burner, for use with gaseous or liquid fuel comprising a ceramic combustion chamber having inlets for primary comprising air and means for supplying to the chamber and igniting a flow of fuel, said chamber also having constricted outlet means for discharge of hot partly burned gas, a remainder-air chamber surrounding said combustion chamber for preheated air necessary to complete the combustion of said fuel and nozzle openings disposed in a ring around said combustion chamber outlet means for discharging air from said remainder-air chamber in high velocity jets, and further comprising:

a cylindrical wall **(9)** coaxial with and spaced from said combustion chamber, extending over at least part of the length of said chamber to laterally define said remainder-air chamber therewith and extending rearwardly of said combustion chamber;

an annular nozzle carrier **(33)** connected to said cylindrical wall **(9)** closing off the forward end of said remainder-air



chamber, having nozzle openings therein for forming said high velocity remainder air jets and against which said combustion chamber bears for support, and

means **(30)** for exerting elastic force in an axial direction on said combustion chamber for clamping said combustion chamber against said nozzle carrier **(33)**.

4,586,895

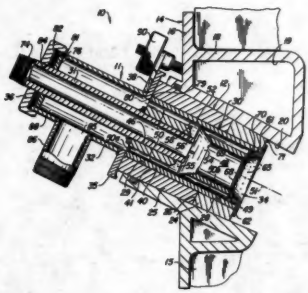
METHOD OF REMOVING SLAG FROM OXYGEN FUEL BURNER

Brett E. Battles, Atlanta, Ga., assignor to The Cadre Corporation, Atlanta, Ga.

Filed May 13, 1985, Ser. No. 733,646

Int. Cl.[4] F24D *23/02*

U.S. Cl. 432—2 **8 Claims**



1. A method of removing slag particles from the flame delivery end of the combustion chamber of a high velocity oxygen-fuel burner of an electric arc furnace and the like comprising the steps of supplying oxygen and fuel to the combustion chamber of a burner at a ratio and at volumes to form a high velocity substantially stoichiometric flame directed to a work product in the furnace until slag present at the surface of the burner becomes hot, reducing the amount of fuel supplied to the combustion chamber of the burner to generate an oxygen-rich flame the major portion of which is contained in the combustion chamber to oxidize the previously heated hot slag, and then increasing the volume of fuel which directs a high velocity oxygen-rich flame from the burner in order to have

the excess oxygen of the flame make intimate contact with the work product in the furnace.

4,586,896

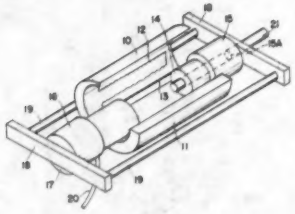
FLATBAKING METHOD AND APPARATUS

Robert S. Smith, 1263 Emory St., San Jose, Calif. 95126

Filed Jan. 18, 1985, Ser. No. 692,771

Int. Cl.⁴ F27D *3/00;* **F24J** *3/00;* **B02C** *11/08;* **F26B** *9/04*

U.S. Cl. 432—9 **2 Claims**



1. A method for flattening sheets of aluminum thinner than 0.085 inches that are warped by surface stresses resulting from coldwork introduced by machining which comprises:

assembling said aluminum sheets as a stack;

positioning said stack between a moveable platen and a fixed platen;

actuating a piston against said moveable platen so as to squeeze said stack between said platens thereby imposing a force against said moveable platen and aluminum surfaces that is greater than 200 pounds per square inch of aluminum surface which will flatten said aluminum sheets at room temperature;

enclosing said compressed stack within a heating enclosure means and, while maintaining said pressure in excess of 200 pounds per square inch, heating said stack to a range between 450 and 500 degrees fahrenheit for a period of time between 90 and 150 minutes;

maintaining said force until said stack is allowed to cool down to room temperature.

4,586,897

INSTALLATION INCLUDING A HEATING FURNACE FOR CONTINUOUS CASTINGS, WHICH ARE CUT TO LENGTH, FROM A CONTINUOUS CASTING INSTALLATION

Ralph Weber, Rio de Janeiro, Brazil, and Herbert Rothe, Baden-Baden, Fed. Rep. of Germany, assignors to Kortec AG, Switzerland and Korf-BSW-Engineering GmbH, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,641

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1984, 3422922

Int. Cl.⁴ F27B *9/00, 5/02;* **B21B** *27/06;* **C21B** *3/00*

U.S. Cl. 432—121 **10 Claims**

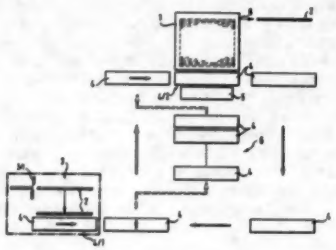
1. An installation including a heating furnace (1,21) for continuous castings (2) which are cut to length (billets, blooms, ingots), by severing means (3/1) from a continuous casting installation (3), the furnace having charging and discharging openings (7,8;24,26) for the continuous castings (2),

a pusher means (5) which is arranged in front of the charging opening (7,24) and which includes at least two thrust rods (10) movable in the direction of the charging opening,

a heat-insulated chamber (4) into which the castings (2) are introduced before being fed into the heating furnace (1,21), and

a transportation means for transporting the castings (2) from the continuous casting installation (3) to the heating furnace (1,21),

characterized in that said heat-insulated chamber is formed as a transportable temperature holding chamber (4) which can be transported by the transportation means between a receiving position (4/1) for receiving the castings downstream of the severing means (3/1) for severing the continuous casting from the continuous casting installation (3) and a delivery position (4/2) between the charging opening (7,24) of the heating furnace (1,21) and the pusher means (5).



4,586,898

MULTI-ZONE FURNACE SYSTEM

Gary A. Orbeck, Windham, N.H., assignor to BTU Engineering Corporation, North Billerica, Mass.

Filed Dec. 14, 1984, Ser. No. 681,952

Int. Cl.⁴ F27B *9/14, 9/02;* **F27D** *3/00*

U.S. Cl. 432—122 **6 Claims**

6. A multi-zone furnace comprising:

a furnace chamber having at least one heat zone and at least one zone adjacent to the heat zone and disposed along the length of the furnace chamber;

the heat zone having a hearth at a level different from the hearth level of the adjacent zone;

a walking beam conveyor disposed in the furnace chamber and operative in a short stroke mode to convey a product along the hearth of the heat zone, and in a long stroke mode to convey a product from the heat zone to the adjacent zone.

4,586,899

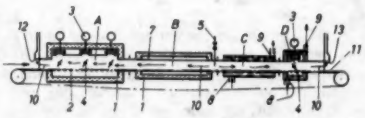
GAS ATMOSPHERE HEATING FURNACE

Susumu Takahashi, Yokohama, Japan, assignor to Kanto Yakin Kogyo K.K., Japan

Filed Jul. 9, 1984, Ser. No. 629,000

Int. Cl.⁴ F27B *9/00, 7/00*

U.S. Cl. 432—148 **3 Claims**



1. In a continuous heating furnace having means for conveying articles in a predetermined path successively through a plurality of chambers, each having an inlet and an outlet, and being formed in the furnace to communicate with each other, and within at least one of which chambers the articles pass

through a baffle casing, which is mounted in said one chamber in spaced relation to the walls defining said one chamber, and wherein an atmosphere gas passing longitudinally through said one chamber is forced also to be circulated as a heating or cooling gas convectionally along a flow path extending substantially transversely of the longitudinal axis of said one chamber, the improvement comprising

plate means positioned in said one chamber outside said predetermined path of travel of the article conveyed through said one chamber and within said flow path of the forced gas,

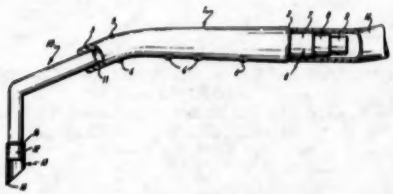
said one chamber being a preheating chamber communicating with the inlet to an adjacent heat-treatment chamber, and said plate means being mounted in said space between the walls of said preheating chamber and said baffle casing for adjustment between one position in which said plate means extends substantially parallel with said flow path of the forced heating or cooling gas, and another position in which said plate means extends substantially transversely of said flow path.

4,586,900

DENTAL ASPIRATOR TUBE

Victor Hymanson, 37 Knowsley St., Bury, Lancashire, and Julian E. Paul, 94 Moss La., Sale, Manchester M33 5BT, both of England

Filed Mar. 12, 1985, Ser. No. 710,848
Int. Cl.[4] A61C *17/09*
U.S. Cl. 433—96 3 Claims



1. A dental aspirator tube comprising:

an elongated tubular plastics handle having first and second ends and which is tapered from said first end towards said second end thereof, a major portion of the handle starting from said first end being straight and the remaining minor portion up to said second end being inclined at an angle to said major portion, and said handle being shaped to define integral finger grips thereon;

a plastics tip for insertion into a patient's mouth comprising a tube which is of a uniform diameter throughout which diameter is smaller than that of second end of said handle, said tube having first and second ends and being straight except for a bend therein through a sharp angle at a position intermediate said ends, said tube being securely fixed at the said first end thereof in the said second end of said handle;

a short tubular end protector mounted on said second end of said tip tube so as to project freely therefrom, said protector terminating in a bevelled free end;

a tubular plastics connector section having first and second ends, said first end thereof having a diameter which is smaller than that of the said first end of the handle, said first end of the connector section being securely fixed in the first end of the handle, and said section having successive portions of progressively reduced diameter from said first end to said second end thereof so as to be capable of fitting securely yet releasably within suction tubing of different diameters.

4,586,901

METHOD AND INSTRUMENT FOR CONDENSING RESTORATIVE DENTAL MATERIALS

John S. Tanaka, Menlo Park, and William M. Belef, Mountain View, both of Calif., assignors to Shofu Dental Corporation, Menlo Park, Calif.

Filed Oct. 10, 1984, Ser. No. 659,243
Int. Cl.[4] A61C *3/08*
U.S. Cl. 433—164 4 Claims

1. A dental instrument to condense a soft restorative material inside a cavity preparation having walls and peripheral margins comprising,

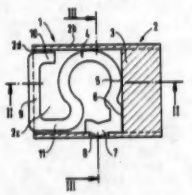
an elongated handle having at least one end bent at an angle thereto, and an elastomeric tip removably attached to said end, the tip being sufficiently oversize with raised peripheral regions to surround and seal the entire perimeter of a cavity preparation, and having a raised central region to urge said material to adapt to the cavity walls and margins under hand pressure, the peripheral regions of the tip being resiliently deformable to deform to continue to surround and seal the cavity preparation when said central region is moved to urge said material.

4,586,902

ATTACHMENT FOR COUPLING DETACHABLE AND PERMANENTLY INSTALLED COMPONENTS OF DENTAL PROSTHESES TO EACH OTHER

Adam Obersat, Gärtnereistrasse 25, D-6750-Kaiserslautern, Fed. Rep. of Germany

Filed Sep. 26, 1984, Ser. No. 655,025
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1983, 3335904; May 24, 1984, 3419359
Int. Cl.[4] A61C *13/22*
U.S. Cl. 433—177 11 Claims

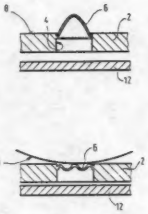


1. A separable attachment between stationary and removable components of a dental prosthesis, comprising a female detent member in one of the components and a male detent member, said male detent member comprising a flat hollow casing provided in the other component and defining a flat compartment having a width greatly exceeding its height, and an opening communicating with said compartment, a flat serpentine spring slidably installed in said compartment and having a width approximating the width of said compartment, and a plunger biased by said spring and normally extending from the casing through said opening under the bias of said spring, said plunger being receivable in the female detent member and said spring having mutually inclined portions located in a common plane and the thickness of said spring approximating the height of said compartment.

4,586,903
MEANS FOR GENERATING A TACTILE CHARACTER FIELD

Joachim Burchart, Schlangen, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Filed Jan. 3, 1985, Ser. No. 688,584
Claims priority, application Fed. Rep. of Germany, Jan. 3, 1984, 3400094
Int. Cl.[4] G09B 21/02
U.S. Cl. 434—114 8 Claims



1. Apparatus for producing fields of tactile-sensible characters comprising:

a data medium of first thickness defining opposite reading and bearing surfaces, said medium containing a two-dimensional array of spaced tactile data areas, the material thickness of the data areas being substantially less than the thickness of the medium;

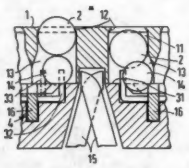
each of said data areas being formed of an elastic material of dome-like configuration and of sufficient rigidity to be stable in each of convex and concave conditions relative to said reading surface and capable of an over-center snap-action transition between said conditions; and

each of said data areas being compressible from either of said conditions to an intermediate nonstable condition in which it is essentially flush with the surfaces of said medium without experiencing the over-center snap-action transition to the opposite condition.

4,586,904
DEVICE FOR FORMING TACTILE DISPLAY

Lubomir Chlumsky, Vienna, Austria, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 29, 1985, Ser. No. 717,727
Claims priority, application Austria, Mar. 30, 1984, 1095/84
Int. Cl.[4] G09B 21/02
U.S. Cl. 434—114 11 Claims



1. A device for forming a tactilely readable display including Braille characters, comprising:

a display carrier having a substantially planar surface, said display carrier being provided with a multiplicity of well-shaped recesses in a matrix-like array, each of said recesses communicating at one end with a respective one of a multiplicity of openings in said planar surface, each of said recesses communicating at an opposite end with a respective one of a multiplicity of chamber-like enlargements;

a multiplicity of first balls equal in number to said recesses, each of said balls being disposed in a respective one of said recesses, said openings being smaller in size than said first balls;

a multiplicity of second balls of magnetically soft material equal in number to said recesses, said second balls being disposed in respective ones of said enlargements, each of said enlargements being provided with means for supporting the respective one of said second balls alternatively in a first stable position, corresponding to a raised position of the respective one of said first balls, and a second stable position, corresponding to a lowered position of said respective one of said first balls;

frame means connected to said display carrier for supporting same;

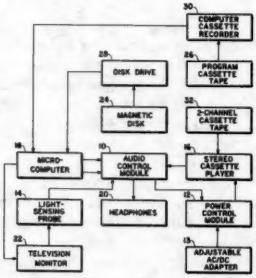
resetting means coupled to said frame means for placing all of said second balls in one of said first and said second stable position;

setting means linked to said frame means for moving selected ones of said second balls into the other of said first and said second stable position upon an actuation of said resetting means placing all of said second balls in said one of said first and said second stable position, thereby producing a tactilely readable display at said planar surface formed by the protrusion of some of said first balls through the associated openings in said planar surface to provide raised raster dots, said setting means including a multiplicity of magnetic bridge pieces each juxtaposed in part to a respective one of said enlargements for facilitating the generation of magnetic field lines to move said second balls from said one of said first and said second stable position to said other thereof, said setting means further including electromagnetic energization means juxtaposable to said magnetic bridge pieces for generating a magnetic field in selected ones thereof.

4,586,905
COMPUTER-ASSISTED AUDIO/VISUAL TEACHING SYSTEM

James W. Groff, 15335 La Alameda, Morgan Hill, Calif. 95037

Filed Mar. 15, 1985, Ser. No. 712,399
Int. Cl.[4] G09B 7/04
U.S. Cl. 434—307 12 Claims



1. A computer-assisted audio/visual teaching system for presenting synchronized audio and visual instructional material comprising in combination;

microcomputer means for running an instructional program, said microcomputer means further including sound effects generation means and alpha-numeric keyboard means for entering student responses into said microcomputer means;

television monitor means operatively connected to said microcomputer means for displaying text and graphics of said instructional program;

magnetic record means for permanently storing said instructional program;

magnetic record reproducing means operatively connected to said microcomputer means for loading said instructional program into said microcomputer means;

plural channel audio record means containing differing instructional narrative, positive reinforcement, and remedial instruction recorded on two parallel channels and related control tones recorded on one parallel channel for permanently storing the audio portion of said synchronized audio and visual instructional material, said control tones being recorded at selected intervals where it is desired to stop said plural channel audio record means;

plural channel audio record reproduction means for reproducing said instructional narrative, positive reinforcement, and remedial instruction and said control tones of said plural channel audio record means;

power control means operatively associated with the power supply circuit of said plural channel audio record reproduction means and an external power source for selectively supplying power from said external power source to said plural channel audio record reproduction means;

audio control means operatively associated with the audio output of said plural channel audio record reproduction means, said microcomputer means, and said power control means for processing and distributing said audio output of said plural channel audio record reproduction means and said sound effects generation means of said microcomputer means and for selectively controlling the power output of said power control means; and

transducer means operatively connected to said audio control means for reproducing the processed and distributed audio output of said audio control means,

wherein said audio control means further include:

rechargeable power supply means for energizing said audio control means;

low battery indicator means operatively associated with said rechargeable power supply means for indicating when said power supply means require recharging;

power switch means for controlling power to said audio control means;

audio input circuit means comprising a first connector means for connecting a first input channel and a second input channel of said audio control means to a like first and second channel of said audio record reproduction means;

sound-actuated switch means operatively associated with said first input channel for detecting recorded sound on said first input channel and providing a logical signal in response to said recorded sound;

control tone receiver means operatively associated with said second input channel for detecting recorded control tones on said second input channel and providing a logical signal in response to said recorded control tones;

computer sound effects input circuit comprising a second connector means and audio transformer means for coupling computer sound effects with said audio control means;

volume control means operatively connected to said computer sound effects input circuit for adjusting volume of said sound effects of said microcomputer means;

sound effects preamplification and amplification means operatively associated with said volume control means for amplifying said computer sound effects;

light-sensing input circuit means comprising a third connector means and amplifying means for selectively connecting said audio control means to light-sensing means and amplifying actuation control signals of said television monitor means;

computer port input means comprising a fourth connector means for selectively connecting said audio control means to an output port of said microcomputer means and for providing a logical signal in response to said actuation control signals of said microcomputer means;

computer tone receiver means operatively associated with the output of said sound effects preamplification and amplification means for detecting a discrete sound effects tone and providing actuation control signals in response to said sound effects tone;

gating means operatively associated with said light-sensing input circuit means, said computer port input means, and said computer tone receiver means for transmitting said actuation control signals of said light-sensing input circuit means, said computer port means, and said computer tone receiver means;

mode switching means and inverting means operatively associated with said gating means for selectively conditioning said actuation control signals of said light-sensing input circuit means to be compatible with a black-on-white and white-on-black display of said microcomputer means and television monitor means;

silicon controlled rectifier means operatively associated with said power control means, the output of said mode switching means, and said control tone receiver means, said controlled rectifier means made conductive by said actuation control signals and made non-conductive by said recorded control tones for selectively energizing the output of said power control means and associated said audio record reproduction means;

control output means operatively associated with said silicon controlled rectifier means comprising a fifth connector means for electrically connecting said silicon controlled rectifier means to said tape player control input means of said power control means;

clock means operatively associated with the output of said mode switching means for providing a single clock pulse in response to each actuation control signal of said light-sensing input circuit means, said computer port input means, and said computer tone receiver means;

shift register means operatively associated with said clock means for providing a logical output when twice clocked by said clock means in response to two actuation control signals of said light-sensing input circuit means, said computer port input means, and said computer tone receiver means;

audio relay means, the first and second fixed contacts thereof being operatively associated with said first input channel and second input channel of said audio control means, the relay coil thereof being operatively associated with the output of said shift register means for providing an audio output of said first input channel when said relay coil is not energized in response to a single actuation control signal and providing an audio output of said second input channel when said relay coil is energized in response to two actuation control signals;

missing-pulse detector means operatively associated with the output of said sound-actuated switch means for providing a logical output when a brief period of recorded silence is detected on said first input channel by said sound-actuated switch means;

first shift register reset means operatively associated with said missing-pulse detector means for resetting said shift register means in response to said brief period of recorded silence, thereby de-energizing said relay coil of said audio relay means and switching the audio output of said second input channel to said first input channel, said missing-pulse detector preventing switching from said second input channel to said input channel while a recorded instructional segment is in progress on said first channel;

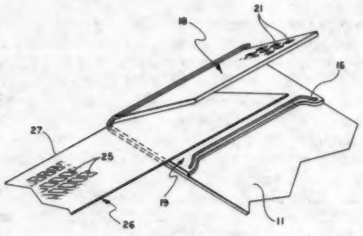
second shift register reset means operatively associated with said mode switching means for resetting said shift register means in response to a said actuation control signal subsequent to a predetermined delay; and audio output circuit means operatively associated with a wiper contact of said audio relay means and said sound effects preamplification and amplification means for providing an audio output comprising either said first input channel or said second input channel and said sound effects of said microcomputer means.

4,586,906

LOTTERY MARKING GUIDE

Agostino R. Buccieri, Jr., 4440 Haskell Ave., Encino, Calif. 91436

Filed May 31, 1985, Ser. No. 739,526
Int. Cl.[4] B32B *3/24*
U.S. Cl. 434—364 **4 Claims**



1. A marking guide comprising:

a first rectangular layer having a predetermined width and a predetermined length both large in comparison to its thickness;

a second rectangular layer having a width and length approximately the same as said predetermined width and said predetermined length respectively,

said second layer width and length also being large in comparison to its thickness,

said first layer including a backing having one edge along the length thereof bonded to one edge of said first layer; and

a rectangular lottery card removably sandwiched in between said first and second layers;

said lottery card having an obverse face with indicia thereon including rectangles identifiable with respective numbers,

said second layer having a plurality of rows and columns of slots therethrough,

said lottery card rectangles lying in registration with said second layer slots,

said second layer being more rigid than said first layer so as to guide manual movement of a pen or pencil in selected second layer slots and thereby to assist in filling in predetermined ones of said lottery card rectangles,

said first layer being more flexible than said second layer so as to permit peeling back said first layer to insert and to retrieve said lottery card into and from the space between said first and second layers,

said first and second layers being unbonded to each other around three edges so as to permit the said peeling back of said first layer.

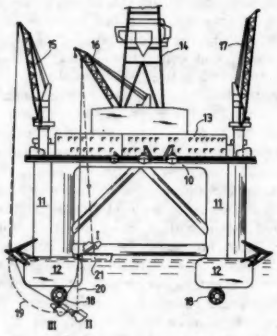
4,586,907

MEANS FOR MOUNTING A THRUSTER PROPELLER UNIT

Nils-Ake Florander, Gothenburg, Sweden, assignor to Gotaverken Arendal AB, Sweden

PCT No. PCT/SE84/00077, § 371 Date Oct. 31, 1984, § 102(e) Date Oct. 31, 1984, PCT Pub. No. WO84/03478, PCT Pub. Date Sep. 13, 1984
PCT Filed Mar. 5, 1984, Ser. No. 678,563
Claims priority, application Sweden, Mar. 4, 1983, 8301197
Int. Cl.[4] B63H *1/14*
U.S. Cl. 440—49 **12 Claims**

1. Means for mounting a thruster propeller unit in an opening in the bottom structure of a vessel and comprising at least two lifting lines, passing out through the bottom plating outside of the opening and being attachable to the thruster propeller unit, when the latter has been brought to a position adjacent to the opening, characterized in that each lifting line is passed through a number of lock chambers mounted at the bottom plating, each permitting the passage of a lifting line and adjacent to the bottom plating including a first, rigid tubular member, enclosing a passage substantially wider that the diameter of the lifting line, and a second, tubular member which is



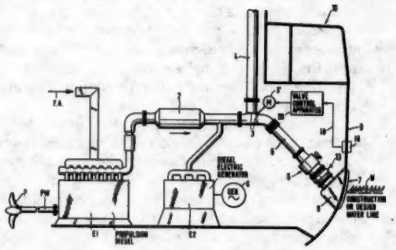
resilient at least transversely to the lifting line, said second member, at its end remote from the bottom plating, supporting a packing sealing around the associated lifting line, and hoisting means within the vessel for operating said lines.

4,586,908

EXHAUST GAS SYSTEM FOR THE INTERNAL COMBUSTION ENGINES OF A SHIP

Norbert Schlichthorst, Beckdorf, Fed. Rep. of Germany, assignor to Blohm & Voss AG, Hamburg, Fed. Rep. of Germany

Filed Jun. 18, 1984, Ser. No. 621,508
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1983, 3321782
Int. Cl.[4] B63H *21/14*
U.S. Cl. 440—89 **10 Claims**



1. In an exhaust gas system including a muffler coupled to receive exhaust gases from at least one internal combustion engine carried by a ship moving upon a surface of a body of water, the combination of:

first gas passage means for conducting said exhaust gases, partially, below said surface of said water at least when said ship travels on a substantially calm body of water;

second gas passage means for conducting said exhaust gases above said surface of said water;

valve means responsive to the position of said ship, in relation to said surface of said water, for selecting one of said first and said second gas passage means for conducting said exhaust gases;

said valve means having means for holding said valve means in a position for conducting said exhaust gases through said first gas passage means except under emergency conditions of operation of said ship, said emergency con-

ditions of operation including when said first gas passage means have been submerged under water to a predetermined depth;

first cooling means connected with said first gas passage means for cooling said exhaust gases conducted by said first gas passage means;

passing means, connected with said first cooling means, for passing said water from said body of water through said first cooling means when said ship moves through said water;

said first gas passage means having a portion adjacent to said water, said portion adjacent to said water having second cooling means for admitting said water adjacent thereto, said second cooling means for cooling said exhaust gas yet further;

substantially all parts of said second cooling means, for admitting said water into said first gas passage means, being stationary with respect to said ship; and

said second cooling means, for admitting said water into said first gas passage means, having means for admitting said water adjacent thereto, both during a forward motion and a reverse motion of said ship, said means for admitting being disposed partially below said surface of said water, at least when said ship travels on a substantially calm body of water, whereby said admitted water cools said exhaust gases in said first gas passage means prior to conduction partially below said surface of said water, at least when said ship travels on a substantially calm body of water, without any moving parts.

4,586,909

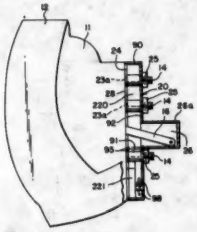
INBOARD/OUTBOARD MOTOR BELL HOUSING COVER

Charles Rosato, 37 Beach Ave., Copiague, N.Y. 11726

Continuation-in-part of Ser. No. 355,122, Mar. 5, 1982, abandoned. This application May 21, 1984, Ser. No. 612,624

Int. Cl.⁴ B63H *23/32*

U.S. Cl. 440—112 **4 Claims**



1. A combination comprising:

(a) an inboard/outboard motor bell housing having a lower unit attached by the housing studs to said bell housing with a shift assembly protruding from said bell housing after the removal of the lower unit and an opening being formed by said removal of said lower unit; and

(b) a cover being formed with a lip and being formed so as to provide a first cavity and a second cavity being substantially deeper than said first cavity and being formed with a plurality of holes, said holes being sized and spaced to match the studs of said housing; said cover being formed with a peripheral edge wall; whereby with mounting said cover to the bell housing through said studs and holes, the shift assembly of said housing protrudes into the second cavity and said opening is covered as if the lower unit was in place;

(c) said cover further comprising a barrier wall being transversely disposed in said first cavity to separate said first cavity into an upper section and lower section, said cover fitting into said housing opening; and

(d) said peripheral edge wall being contoured to form a plurality of said holes, and said barrier wall being contoured to form a second plurality of said holes.

4,586,910

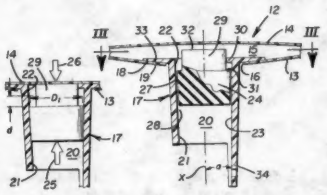
INFLATION VALVE FOR BALLOONS AND THE LIKE

Bradley Buchanan, San Francisco, Calif., assignor to M&D Balloons, Brisbane, Calif.

Filed Sep. 17, 1984, Ser. No. 645,594

Int. Cl.⁴ A63H *3/06, 33/00;* **F16K** *15/20*

U.S. Cl. 446—220 **15 Claims**



1. A balloon having an inflatable chamber defined therein and an inflation valve of the manual or mechanically operated type for selectively filling said chamber with a fluid, said inflation valve comprising a stem having a rigid inner wall defining a filling passage therethrough communicating with said chamber, said filling passage having an inlet and an outlet, and elastomeric plug means, having an outer surface and a durometer hardness in the range of from thirty to eighty, reciprocally mounted in said passage for movement in a first direction toward said chamber and in a second, opposite direction away from said chamber for (1) openly communicating said passage with said chamber solely through a passageway defined between the outer surface of said plug means and the inner wall of said stem to permit filling of said chamber with said fluid when said plug means is moved to a first predetermined distance in said first direction, and (2) closing said passageway and sealing said passage to prevent escape of said fluid from said chamber when said plug means is moved a second predetermined distance in said second direction to compress the outer surface of said elastomeric plug means against the rigid inner wall of said stem to form an annular static seal therebetween, said plug means being disposed for reciprocal movement along a longitudinal axis of said valve and wherein said passage is defined by an at least generally annular inner wall of said stem that is disposed at an angle within the approximate range of from 0° to 10° relative to said longitudinal axis, when viewed in longitudinal cross-section and in said second direction, and the inner wall of said stem converging at an angle within the approximate range of from 2° to 10° relative to said axis and in said second direction.

4,586,911

TRANSFORMABLE TOY VEHICLE

Katsushi Murakami, Tokyo, Japan, assignor to Kabushiki Kaisha Bandai, Tokyo, Japan

Filed Oct. 13, 1983, Ser. No. 541,639

Claims priority, application Japan, Jan. 19, 1983, 58-6911; Feb. 1, 1983, 58-15065; Mar. 24, 1983, 58-49337

Int. Cl.⁴ A63H *3/46, 17/00*

U.S. Cl. 446—376 **11 Claims**

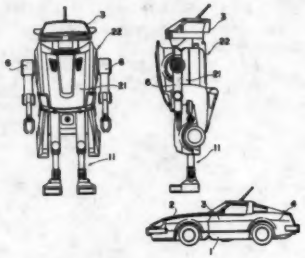
1. A transformable toy vehicle capable of being converted into a toy robot comprising;

a body having front, middle, and rear compartments;

a chassis for supporting said front and rear compartments and having front and rear vehicle wheels thereupon;

pivotal means for rotating said front and rear compartments relative to each other to form a trunk body of said robot and for mounting said middle compartment to form a head portion of said robot; and

front and rear wheel support members pivotally connected to said chassis for rotatably bearing said wheels, said front wheel support member being provided with arms means, and said rear wheel support member being provided with



leg means, said arm and leg means being housed in respective recesses formed in said front and rear compartments for ejecting said arm and leg means therefrom to form arms and legs of said robot.

4,586,912

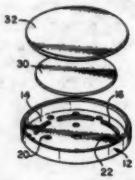
GAME CALL

Denton D. Adams, R.D. #1, Thompsontown, Pa. 17094

Filed May 14, 1985, Ser. No. 734,035

Int. Cl.[4] A63H *5/00*; G10D *13/08*

U.S. Cl. 446—397 **13 Claims**



1. A game call comprising:

a support member having a base with a flange around a perimeter of the base and ribs extending upwardly from the base, the ribs being shorter than the flange, the base having a plurality of apertures;

an outer planar member affixed to a distal end of said flange;

a resonant inner planar member affixed to distal ends of said ribs; and

means for vibrating said outer planar member, thereby generating a game calling sound through vibration of both the inner and the outer planar members.

4,586,913

FRONT DERAILLEUR FOR A BICYCLE

Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

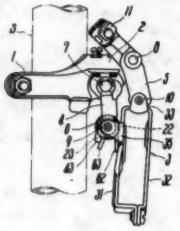
Filed Aug. 16, 1984, Ser. No. 641,291

Claims priority, application Japan, Aug. 16, 1983, 58-126664[U]

Int. Cl.[4] F16H *9/24, 11/08*

U.S. Cl. 474—80 **6 Claims**

1. A front derailleur for a bicycle, including a fixing member, a chain guide having an inner plate and an outer plate, a pair of linkage members supporting said chain guide to reciprocate with respect to said fixing member, a return spring including a coiled portion and first and second retaining ends extending therefrom, said return spring biasing said chain guide in a direction of backward movement, a cap having an elastically deformable cylindrical fitting portion fitted onto an outer periphery of said coiled portion of said return spring, said cylindrical fitting portion of said cap having an axially extending slit which is expandable to a width larger than an outer



diameter of said coiled portion of said return spring due to elastic deformation of said cylindrical fitting portion, said cap also having a positioning means for positioning said slit adjacent to said inner plate of said chain guide.

4,586,914

MULTISTAGE FRONT CHAIN GEAR FOR A BICYCLE

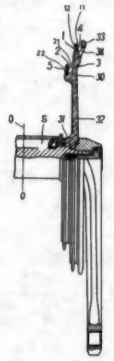
Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Mar. 12, 1985, Ser. No. 710,684

Claims priority, application Japan, Mar. 15, 1984, 59-37737[U]

Int. Cl.[4] F16H *55/12*

U.S. Cl. 474—160 **3 Claims**



1. A multistage front chain gear for a bicycle comprising:

(a) a gear body having at least one larger diameter toothed body and at least one smaller diameter toothed body, said gear body being formed of synthetic resin, said larger diameter toothed body and said smaller diameter toothed body being axially displaced relative to each other and each comprising an outside surface positioned outwardly with respect to a center line of a width dimension of the bicycle and an inside surface positioned inwardly with respect to said center line of said width dimension when said toothed bodies are mounted to the bicycle;

(b) a first contact plate formed of material having a greater cutting resistance than said synthetic resin, attached to at least said outside surface of said larger diameter toothed body, and covering each tooth of said larger diameter toothed body; and

(c) a second contact plate formed of material having a

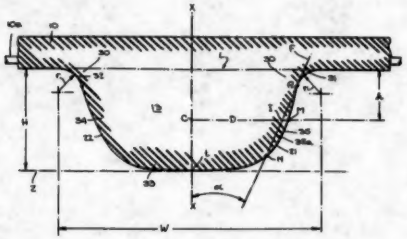
greater cutting resistance than said synthetic resin, attached to at least said inside surface at said smaller diameter toothed body, and covering each tooth at said smaller diameter toothed body.

4,586,915

POWER TRANSMISSION SYSTEM AND TOOTHED BELT THEREFOR

Thaddeus F. Cathey, Woodbury, and Rodney J. Nelson, Southbury, both of Conn., assignors to Uniroyal Power Transmission Company, Inc., Middlebury, Conn.

Filed Jan. 12, 1984, Ser. No. 570,156
Int. Cl.[4] F16G *1/28*
U.S. Cl. 474—205 **20 Claims**



1. An endless flexible power transmission belt having a plurality of teeth separated by grooves, each tooth in longitudinal cross-section being symmetrical about a tooth center line and including a root portion, a tip portion and opposite convex curvilinear flank portions extending between said tip portion and said root portion, said root portion being defined by a first and a second arc each approximating the arc of a circle on opposite sides of said tooth center line and extending into the corresponding flank portions of the tooth and each said groove having a base portion on the belt land line connecting said first arc of one tooth with said second arc of the next consecutive tooth, said tooth having a height measured between the extremity of said tooth tip portion and said belt land line and having a width measured between said opposite flank portions along a width line parallel to said belt land line at a distance therefrom of approximately 40% to 50% of said tooth height, each said opposite convex curvilinear flank being formed such that when an imaginary line drawn at an angle of between 19° to 25° with respect to said tooth centerline and passing through the point at which the corresponding one of said first and second arcs intersect the flank portion in question it will intersect said width line at a point located between 94% and 98% of the distance from said centerline to the surface of the convex curvilinear flank portion in question as measured along said width line.

4,586,916

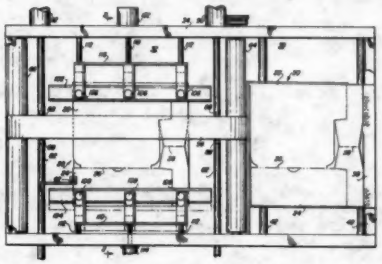
CORRUGATED CARTON SEPARATOR

Donald H. Williams, Adams, and LeRoy Jones, Sr., Oxford, both of Wis., assignors to Consolidated Papers, Inc., Wisconsin Rapids, Wis.

Filed Jan. 30, 1985, Ser. No. 696,507
Int. Cl.[4] B26F *3/02*; B31B *1/00*
U.S. Cl. 493—10 **12 Claims**

1. Apparatus for separating folded two-on corrugated cartons, comprising a pair of clamps; means extending between a supply of folded two-on cartons and said clamps for conveying folded two-on cartons seriatim from the supply to said clamps and for positioning opposite edges of each two-on carton for being gripped by a respective one of said clamps; and means coupled with said clamps for operating said clamps to sequentially grip the opposite edges of each two-on carton, to move said clamps relative to and away from each other to pull the two-on carton apart into two separate cartons, and to then release the separated cartons, said conveying means also conveying the separated cartons away from said clamps after said clamps release the cartons.

9. A method of separating folded two-on corrugated cartons, comprising the steps of advancing successive two-on cartons to a separating station and, at the separating station,



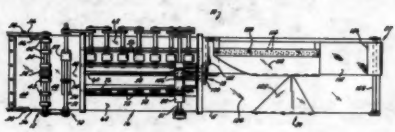
terminating the advancing step, mechanically gripping and pulling opposite edges of each successive two-on carton to pull the two-on carton apart into two separate cartons, releasing the edges of the separated cartons, and then conveying the released and separated cartons out of the separating station to a collection point while simultaneously advancing the next successive two-on carton to the separating station.

4,586,917

FILE HINGE FOLDING ASSEMBLY

Daniel T. Robinson, Greenfield, Wis., assignor to Kempsmith Machine Co., Milwaukee, Wis.

Filed Jun. 18, 1984, Ser. No. 621,668
Int. Cl.[4] B31B *1/25, 1/36, 31/26*
U.S. Cl. 493—241 **15 Claims**



1. An inline hinged file folder folding assembly for creasing the flexible hinge provided between two file folder panels, said assembly comprising a base, means mounted on said base for scoring the hinge of the file folder, means mounted on said base adjacent the said scoring means for creasing the hinge along said score line to form a gusset, and means mounted on said base adjacent to said creasing means for folding one of the file folder panels over the other file folder panel with the gusset folded within the folded file folder said creasing means being located between said scoring means and said folding means.

4,586,918

CENTRIFUGE ROTOR HAVING A LOAD TRANSMITTING ARRANGEMENT

Paul M. Cole, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

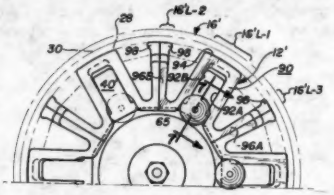
Filed Oct. 1, 1984, Ser. No. 656,646
Int. Cl.[4] B04B *5/02*
U.S. Cl. 494—20 **19 Claims**

1. A centrifuge rotor for subjecting a sample carried in a sample container to a centrifugal force field, the rotor having a stress confining enclosure thereon, comprising:

a sample container support housing assembly for supporting the sample container within the rotor such that, in opera-

tion, the housing assembly is radially adjacent to a localized region of the enclosure; and,

a force transmitting arrangement operably associated with



the sample container support housing assembly for transmitting centrifugal force imposed on the container to the enclosure at locations spaced from the localized region thereby to more uniformly load the enclosure.

4,586,919

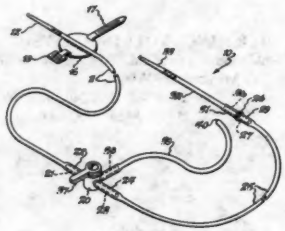
EXTERNAL SHUNT AND METHOD FOR PROCURING AND PRESERVING THE ENDOTHELIUM OF A VEIN USED IN ARTERIAL BYPASS

Syde A. Taheri, 268 Dan Troy, Williamsville, N.Y. 14221

Filed Apr. 6, 1984, Ser. No. 597,706

Int. Cl.⁴ A61M *5/00*

U.S. Cl. 604—9 **10 Claims**



1. A shunt from an artery to a vein being harvested for use in a remote portion of a body comprising a first elongated tube, a first end on said first elongated tube for insertion into an artery, a second end on said first elongated tube for insertion into a distal portion of a vein to thereby maintain communication between said artery and said vein even though normal blood flow thereto is disrupted, valve means intermediate said first and second ends of said first elongated tube, a second elongated tube having first and second ends, said first end of said second elongated tube being coupled to said valve means for selectively receiving blood from said first elongated tube when said valve means are open, said second end of said second elongated tube being open to direct blood flowing through said second elongated tube to irrigate the external portion of said vein being harvested, securing means for securing said first end of said elongated tube to said artery, said securing means comprising a planar tab secured to said elongated tube proximate said first end, and strap means mounted on said planar tab.

4,586,920

CONTINUOUS FLOW PERITONEAL DIALYSIS SYSTEM AND METHOD

Alan M. Peabody, 102 Meadow Creek Ct., Greer, S.C. 29651

Filed Jul. 9, 1984, Ser. No. 629,130

Int. Cl.⁴ A61M *5/00*

U.S. Cl. 604—29 **20 Claims**

5. A continuous flow peritoneal dialysis system comprising:

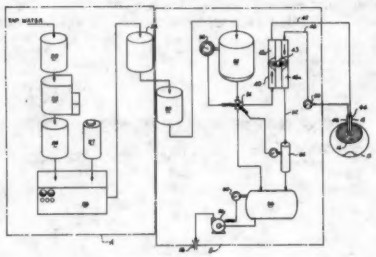
a source of sterile dialysis fluid;

an inflow line adapted for connection to an inflow catheter of a double peritoneal catheter implanted in the peritoneal cavity of a patient;

an outflow line adapted for connection to an outflow catheter of said double peritoneal catheter;

valve means connecting said source of dialysis fluid to said inflow and outflow lines for controlling the flow of dialysis fluid in and out of said double peritoneal catheter;

disposal means connected to said valve means for disposing of said outflow of dialysis fluid;



pressure monitoring means in the outflow line for sensing the pressure of dialysis fluid in said peritoneal cavity; and

flow control means controlling said valve means in response to said pressure monitoring means so that flow of said dialysis fluid through said peritoneal cavity is controlled to maintain a desired volume and pressure of fluid in said cavity.

4,586,921

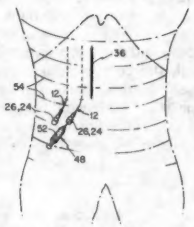
METHOD OF APPLYING A LOCAL ANESTHETIC AGENT TO A WOUND

Daniel Berson, 6 Rollingwood Dr., New City, N.Y. 10956

Filed Aug. 17, 1983, Ser. No. 523,929

Int. Cl.⁴ A61M *31/00*

U.S. Cl. 604—49 **3 Claims**



1. A method of selectively applying continuously or intermittently a local anesthetic along the length of an operative wound comprising:

inserting a catheter means into the subcutaneous plane and inserting a catheter into the muscular plane, each catheter means substantially parallel to and in close proximity to the wound, each catheter means including means for distributing a liquid injected therein along the length of the wound in said respective plane;

selectively, intermittently or continuously injecting a local anesthetic agent into each of the catheters to be substantially evenly dispersed along the length of the wound in each of said planes to thereby cause analgesia of the wound.

4,586,922

INTRAVENOUS SYSTEM FOR DELIVERING A BENEFICIAL AGENT

Felix Theeuwes, Los Altos, Calif., assignor to ALZA Corporation, Palo Alto, Calif.

Division of Ser. No. 310,047, Oct. 9, 1981, Pat. No. 4,511,353, which is a continuation-in-part of Ser. No. 283,077, Jul. 13, 1981, abandoned. This application Feb. 15, 1985, Ser. No. 702,273
Int. Cl.[4] A61M 5/14
U.S. Cl. 604—85 3 Claims

1. A formulation chamber for use in an intravenous delivery system, comprising in combination:

(a) a formulation chamber comprising: a wall surrounding a lumen; an inlet for admitting fluid into the chamber; and, an outlet for letting fluid leave the chamber; and,

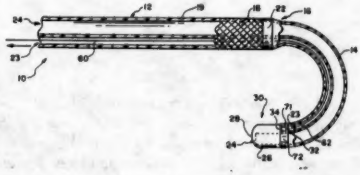
(b) a device for delivering a beneficial agent in the chamber, the device comprising: an inner flexible container containing a beneficial agent, a layer of an osmotically effective solute at least partly encapsulating the container, an outer wall surrounding the container and formed of a material permeable to the passage of fluid and substantially impermeable to the passage of solute, and a passageway communicating with the container and the exterior of the device for delivering the agent at a rate controlled by the device into the formulation chamber over a prolonged period of time.

4,586,923

CURVING TIP CATHETER

Sheldon D. Gould, North Miami, and Gary T. Riggs, West Palm Beach, both of Fla., assignors to Cordis Corporation, Miami, Fla.

Filed Jun. 25, 1984, Ser. No. 624,007
Int. Cl.[4] A61M 25/00
U.S. Cl. 604—95 19 Claims



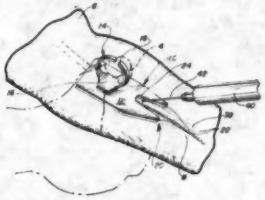
1. A catheter adapted to be inserted into and through the lumen of a blood vessel in a network of branching blood vessels of a body and which is manipulatable therethrough to a desired blood vessel branch within the network of branching blood vessels, said catheter comprising: an elongate tubular body having a distal end and a proximat end; a flexible non-metallic tubular tip portion located at said distal end of said elongate tubular body; a metallic band mounted on said tip portion; at least first and second non-coaxial elongate passageways within said tubular body; at least first and second elongate lumens within said flexible tip portion and mating with said first and second respective elongate passageway within said tubular body; means associated with aid tubular body for providing torsional stiffness to said tubular body; mechanical means situated within said first passageway and said first lumen and coupled to said flexible tip portion for flexing said flexible tip portion; and means for introducing or withdrawing a fluid material into or from said second passageway in said tubular body whereby said catheter can be guided by said flexible tip portion through a branching network of blood vessels in a body to a site in the body for delivering a fluid or withdrawing a fluid from the site in the body, and said mechanical means for flexing said tip portion comprising a wire having a distal end soldered to said metallic band.

4,586,924

VEIN CONSTRICTOR AND IMMOBILIZER

Charles T. Lanning, P.O. Box 323, Watertown, S. Dak. 57201

Filed Jul. 9, 1984, Ser. No. 629,169
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—115 4 Claims



1. An improved vein constrictor and immobilizer that aids needle insertion into a vein, comprising

(a) a rigid pressure plate including a top pressure face, an elongate notch extending endwise and through the plate's thickness, a substantially flat bottom face for engaging the skin above the vein to be penetrated, and an elongate groove in the bottom face beginning at the notch and said groove terminating intermediate said notch and opposing edge of said bottom face; and

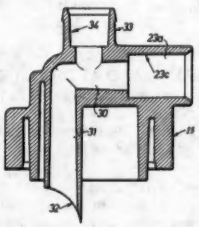
(b) a ring-like handling pressure means structure attached to said top face for insertion of a finger or thumb therein.

4,586,925

HOSE SET FOR EXTRACORPOREAL TREATMENT OF BLOOD AND SIMILAR LIQUIDS

Per-Olov A. V. Carlsson, Sosdala, and Rolf E. Karlberg, Veberod, both of Sweden, assignors to Gambro Lundia AB, Sweden

Filed Sep. 7, 1983, Ser. No. 530,110
Claims priority, application Sweden, Sep. 10, 1982, 8205160
Int. Cl.[4] A61M 5/16
U.S. Cl. 604—251 8 Claims



1. In a drip chamber for insertion in a venous tube set adapted for use in connection with the extracorporeal treat-

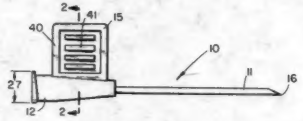
ment of blood or other perishable liquids, which drip chamber includes a body having an upper end and a lower end, a generally vertical outlet arranged in said lower end of said body, and a lid attached to said upper end of said body, the improvement wherein said lid includes an interior, a generally horizontal inlet arranged in a side of said lid, a generally horizontal duct having an outer end in communication with said inlet and an inner end positioned in said interior of said lid, drip forming means depending generally vertically from said inner end of said duct for forming drips out of liquid flowing through said duct from said outer end thereof to said inner end thereof, and a sampling port communicating with said duct between said inner and outer ends thereof, whereby liquid flowing through said duct can be sampled before it drips from said drip forming means.

4,586,926

PERCUTANEOUS ENTRY NEEDLE

Thomas A. Osborne, Bloomington, Ind., assignor to Cook, Incorporated, Bloomington, Ind.

Filed Mar. 5, 1984, Ser. No. 585,950
Int. Cl.[4] A61M *27/00*
U.S. Cl. 604—272 **1 Claim**



1. A percutaneous entry needle comprising:

tubing having one end sharpened for percutanious entry by a bevel that is at an acute angle to the axis of the tubing, said tubing having a sharp tip defined by said bevel which sharp tip is located on one side of said tubing, said tubing having an outer diameter of approximately 18 gauge and the length of said bevel being approximately 0.5 cm.;

a hub rigidly secured to the other end of said tubing, said hub including oppositely projecting luer lock ears which project radially from said axis in directions which are at ninety degrees (90°) to the position of said sharp tip relative to said axis, said hub having a passageway therein that is aligned with said tubing, said hub passageway having a mouth which is larger in diameter than the lumen of said tubing, said passageway tapering inside from said mouth to a smaller size at said tubing, which smaller size corresponds to the size of the lumen of said tubing, said tapering passageway being shaped to guide a wire guide into said tubing lumen; and

a rigid flange rigidly secured to said hub and extending radially thereof, said flange being located on the side of said tubing away from said sharp tip, said rigid flange having ribs, one of said ribs extending around the border of said flange, the rest of said ribs being parallel to one another and located inside of said one rib.

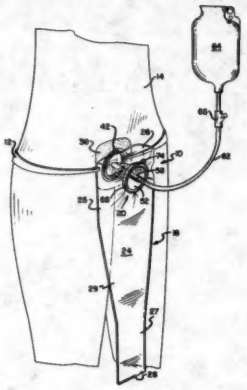
4,586,927

IRRIGATION SLEEVE AND ATTACHMENT THEREFOR

Ole R. Jensen, Rivervale, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 17, 1981, Ser. No. 293,688
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—342 **15 Claims**

1. In combination, an irrigation sleeve for colostomy patients who have a stoma, said sleeve including a pair of ends, at least one of which is closed, a pair of openings located between said ends of said sleeve, one of said openings being sized and shaped to receive the stoma, and a first coupling member formed integrally with said sleeve and surrounding the other opening; and a snap-on attachment for said sleeve, said attachment including a second coupling member formed integrally therewith, said second coupling member cooperating with said first coupling member to form a fluid-tight seal between said sleeve



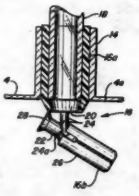
and said attachment when said attachment is snapped onto said sleeve, and supplying means formed integrally with said attachment and fixedly attached thereto for supplying fluid to and through said attachment.

4,586,928

PIVOTING FRANGIBLE VALVE FOR PLASTIC BAGS

Bruce E. Barnes, Kensington; William W. Dupin, Pleasant Hill, and Bruce W. Kuhlemann, Hayward, all of Calif., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Oct. 9, 1984, Ser. No. 659,064
Int. Cl.[4] A61B *19/00*
U.S. Cl. 604—408 **20 Claims**



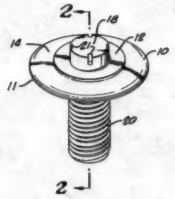
11. In a closed plastic bag system comprising at least one plastic bag in communication with a plastic tubing attached to a cylindrical port on the bag and an externally manipulated integral frangible valve located within the closed system, the improvements comprising the valve having a cylindrical upper member fitting snugly within the port and having a bore at least as large as the tubing and a lower member extending into the bag and comprising a solid bore-sealing portion and at least one tether portion, both being attached separately to the lower portion of the upper member, the bore-sealinig portion being attached to the upper member via a weakened portion adapted to permit complete separation of the bore sealing portion from the upper member by manual pressure applied to the lower member through the walls of the plastic bag, thereby breaking the seal and permitting essentially unobstructed fluid flow between the bag and tubing.

4,586,929

HYDROGEL KERATOPROSTHESIS

Perry S. Binder, P.O. Box 1097, Rancho Santa Fe, Calif. 92067

Filed Apr. 6, 1984, Ser. No. 597,733
Int. Cl.[4] A61F 2/14
U.S. Cl. 623—5 14 Claims



1. A keratoprosthesis, comprising,

a substantially concave hydrogel base plate including a substantially centrally disposed support cylinder integrally fitted through said base plate, said support cylinder protruding through at least one side of said base plate,

inclined engagement surfaces formed within said support cylinder, and

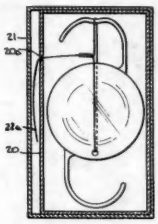
an optical cylinder with inclined engagement surfaces formed about its periphery for engagement with said support cylinder.

4,586,930

INTRAOCULAR LENS AND METHOD OF PREPARING THE SAME FOR INSERTION INTO A HUMAN EYE

Charles D. Kelman, North Shore Towers, 269 Grand Central Parkway, Floral Park, N.Y. 11005

Filed Apr. 4, 1983, Ser. No. 481,782
Int. Cl.[4] A61F 2/16
U.S. Cl. 623—6 11 Claims



1. An intraocular lens and container combination comprising:

a lens having a light-focusing lens body and

flexible position-fixation means joined to said lens body for positioning said lens body in the interior of a human eye, said position-fixation means having at least one portion adapted to be loosely connected to a portion of said lens body; and

a container for protectively containing said lens prior to insertion of the lens in the eye, said container having an opening;

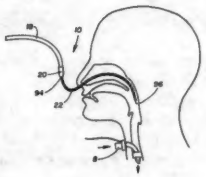
means in said container for loosely connecting said at least one portion of said position-fixation means of said lens to said portion of said lens body, said connecting means having a portion thereof extending through said opening and being adapted to be tightened by a surgeon, from outside said container just prior to removal of said lens from said container for insertion of the lens in an eye, to flex said position-fixation means so as to move said at least one portion of said position-fixation means towards said portion of said lens body, said connecting means being adapted to remain in tightened condition after being tightened.

4,586,931

AUTO ACTUATABLE SWITCH, SPEECH SIMULATOR AND METHOD FOR TRACHEOTOMIZED INDIVIDUALS

Eric D. Blom; Mark I. Singer, and Barry A. Harkleroad, all of Indianapolis, Ind., assignors to Hansa Medical Products, Inc., Indianapolis, Ind.

Division of Ser. No. 329,768, Dec. 11, 1981, abandoned. This application Jun. 5, 1984, Ser. No. 617,702
Int. Cl.[4] A61F 2/20
U.S. Cl. 623—9 40 Claims



1. A speech simulator for a tracheotomized individual comprising

a source of pressurized air;

a regulator governing the pressure of said air;

a valve responsive to actuation by said individual interconnected between said source and said regulator operable between a first position thereof wherein said air from said source is stopped and a second position thereof wherein said air passes through said valve;

means for coupling the air source to the valve;

means for coupling the valve to the regulator;

a reed, a flexible tube for coupling said regulator to said reed, said reed vibrating audibly in response to the passage of said air through said valve and past said reed; and

means for coupling said reed to the pharynx of said individual in fluid communication therewith to introduce said air flowing past said reed into the pharynx of said individual whereby said individual may articulate audibly comprehensible speech.

20. A method for simulating speech in a tracheotomized individual comprising the steps of:

supplying a source of pressurized air;

controlling the flow of said air between a first condition thereof wherein flow of said air is stopped and a second condition thereof wherein flow of said air is allowed in response to actuation by said individual;

regulating the pressure of said air;

ducting said controlled air to a reed;

audibly vibrating said reed in response to the passage of said air past said reed;

introducing said air past said reed transnasally into the pharynx of said individual whereby said individual may articulate audibly comprehensible speech.

4,586,932

ENDOPROSTHETIC BONE DEVICES

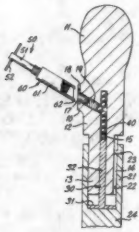
John T. Scales, Stanmore, England, assignor to National Research Development Corp., London, England

Filed Mar. 21, 1984, Ser. No. 592,009

Claims priority, application United Kingdom, Apr. 12, 1983, 8309844

Int. Cl.[4] A61F 2/28

U.S. Cl. 623—16 10 Claims



1. An endoprosthetic device for a long bone which device comprises:

a component of elongate form for use as an endoprosthesis in a long bone and including two parts in longitudinal telescopic engagement defining therebetween a passageway of length variable with said engagement,

one of said parts having a transverse opening affording access to said passageway, a releasable closure member for said opening, and

a plurality of ball bearings located in said passageway by way of said opening to control adjustably the extent of said telescopic engagement.

4,586,933

DUAL ARTICULATING TOTAL KNEE PROSTHESIS

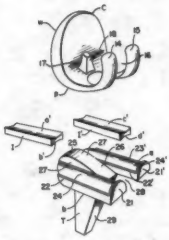
Hiromu Shoji, 14 Grand Canyon Dr., New Orleans, La. 70014, and Shin'ichi Yoshino, 2-35-14, Asahi-machi, Nerima-ku, Tokyo, Japan

Filed Aug. 27, 1984, Ser. No. 644,674

Claims priority, application Japan, Sep. 30, 1983, 58-182908

Int. Cl.[4] A61F 1/00

U.S. Cl. 623—20 6 Claims



1. A dual articulating total knee prosthesis, comprising;

a femoral component having a medial condyle and a lateral condyle and also having a near anatomical curvature at a first articulating surface;

a tibial tray having at least one track at a second articulating surface; and

a plurality of movable insert means, arranged between the femoral component and the tibial tray, for providing the first articulating surface at an upper surface of the insert means in contact with medial and lateral condyles of the femoral component and for providing the second articulating surface at a lower surface of the insert means in contact with the track of the tibial tray;

wherein said track of the tibial tray has an upper convex surface and includes, at its posterior end, a means for stopping movement of the movable insert means sliding thereon.

4,586,934

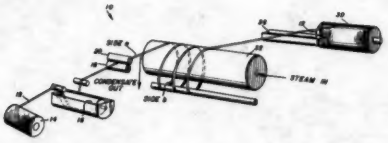
PROCESS AND APPARATUS FOR COLORING TEXTILE YARNS

Paul B. Bialock, and William C. Schwartz, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Continuation-in-part of Ser. No. 592,295, Mar. 22, 1984, abandoned. This application Mar. 22, 1985, Ser. No. 714,869

Int. Cl.[4] D06P 5/00

U.S. Cl. 8—483 53 Claims



1. A method of producing a colored textile yarn comprising the steps of:

(a) applying a colorant-containing liquid to the surface of the textile yarn; and

(b) unevenly heating the textile yarn to cause the colorant in the liquid to substantially migrate toward the source of heat to thereby produce a colored yarn having one portion that is visibly darker in color hue when compared to another portion of the yarn.

4,586,935

METHOD OF PREPARING COAL TO INCREASE ITS CALORIFIC VALUE AND MAKING IT SAFE FOR STORAGE AND TRANSPORT

Norbert Berkowitz, 6605-124 St., Edmonton, Alberta, Canada (T6H 3V4), assignor to Meridian Petroleums Ltd., Calgary and Norbert Berkowitz, Edmonton, both of, Canada, a part interest

Filed Jan. 17, 1985, Ser. No. 692,190

Claims priority, application Canada, Sep. 21, 1984, 462511

Int. Cl.[4] C10L 9/08, 9/10

U.S. Cl. 44—1 R 22 Claims

1. A method of treating low-rank coal to lessen the risk of autogenous heating and attendant combustion hazards, comprising the step of passing said coal through a bath of molten metal to elevate the temperature of said coal into the range Td to Td+50° C., where Td is the decomposition temperature of said coal.

3. The method of claim 2 wherein said molten metal has a specific gravity in excess of that of said coal.

4,586,936

FUEL BRIQUETS

Hans-Georg Schäffer, Aachen; Axel Vogts, Eschweiler; Günter Poppel, Düren-Niederau, and Horst Schürmann, Düren, all of Fed. Rep. of Germany, assignors to Akzo N.V., Arnhem, Netherlands

Continuation of Ser. No. 261,709, May 8, 1981, abandoned. This application Oct. 28, 1983, Ser. No. 546,570

Claims priority, application Fed. Rep. of Germany, May 8, 1980, 3017599; Apr. 8, 1981, 3114141

Int. Cl.[4] C10L 5/00

U.S. Cl. 44—10 C 9 Claims

1. Fuel briquets based upon fuels such as flaming coal, gas coal, semibutiminous coal, forge coal, anthracite, coke, brown coal or charcoal, containing binding agents and additives, obtained by briquetting of 80 to 99% by weight of an essential solid fuel, 0.1 to 19% by weight of a binding agent and 0.1 to 10% by weight of a cationic polyurethane obtained by a monomeric aliphatic dihydroxy compound, which displays at one of the atoms bound to the two dihydroxy groups an aliphatic residue with minimum 10 carbon atoms, being reacted with a polyisocyanate and an aliphatic monomeric diol containing tertiary nitrogen which in the obtaining of said cationic polyurethane is rearranged into its ammonium state; or obtained by reacting aforesaid monomeric aliphatic dihydroxy compound with a polyisocyanate and an appropriate aliphatic monomeric diol in which the nitrogen is present already in its ammonium state.

4,586,937

ANTIMISTING SYSTEM FOR HYDROCARBON FLUIDS

Ilan Duvdevani, Leonia; John A. Eckert, Mountainside; Donald N. Schulz, Annandale, and Kissho Kitano, Fanwood, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

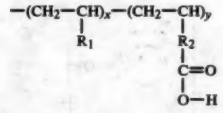
Continuation-in-part of Ser. No. 565,105, Dec. 23, 1983, abandoned. This application Jun. 29, 1984, Ser. No. 625,973

The portion of the term of this patent subsequent to Jun. 18, 2002, has been disclaimed.

Int. Cl.[4] C10L 1/18

U.S. Cl. 44—62 3 Claims

1. An antimisting hydrocarbon solution comprising an organic liquid having a solubility parameter of less than 9.5 mixed with a copolymer having a number average molecular weight of about 10,000 to about 20,000,000, wherein the concentration of said copolymer in said organic liquid is about 0.05 to about 2 grams per 100 ml of said solution, wherein said copolymer has the formula:



wherein R_1 is an alkyl group having about 1 to about 25 carbon atoms, R_2 is an alkylene group having about 3 to 17 carbon atoms, x is about 95.0 to about 99.99 mole % and y is about 0.01 to about 5 mole %.

4,586,938

PROCESS FOR CONDITIONING NATURAL GAS FOR PIPELINE TRANSPORT

Anton E. Cornelissen, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 21, 1984, Ser. No. 653,000

Claims priority, application United Kingdom, Oct. 5, 1983, 8326665

Int. Cl.[4] C10K 1/00; B01D 53/14

U.S. Cl. 48—196 R 6 Claims

1. A process for conditioning a stream of natural gas which contains hydrocarbons and water for pipeline transport, which process comprises:

separating the natural gas stream into a water containing hydrocarbon liquid component and a water containing hydrocarbon gaseous component;

absorbing water and water vapor from the separated hydrocarbon gaseous component and heating the separated water containing hydrocarbon liquid component to cause the water present to dissolve in the liquid hydrocarbon component; and

atomizing the heated hydrocarbon liquid component containing the dissolved water into small droplets that substantially remain in suspension into the treated gaseous component for transport through a pipeline.

4,586,939

PROCESS FOR SEPARATING GASEOUS MIXTURES USING A SEMIPERMEABLE MEMBRANE CONSTRUCTED FROM SUBSTITUTED POLY(ARYLENE OXIDE) POLYMER

George S. Li, Macedonia, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 411,924, Aug. 26, 1982, abandoned, which is a continuation-in-part of Ser. No. 388,847, Jun. 16, 1982, abandoned. This application Nov. 29, 1983, Ser. No. 556,181

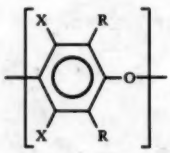
Int. Cl.[4] B01D *53/22*

U.S. Cl. 55—16 28 Claims

1. In a process for the separation of gases from a mixture containing at least two gases into two fractions, one fraction being enriched with at least one of said gases and the other fraction being depleted in same, the process comprising:

contacting the gaseous mixture with a semipermeable membrane in such a manner that a portion of the gaseous mixture selectively passes through the membrane resulting in the enriched fraction being on one side of the membrane and the depleted fraction being on the other side of the membrane, the improvement comprising

the use of a single layer semipermeable membrane containing at least about 25 weight percent, based upon the total weight of the membrane, of at least one substituted poly(arylene oxide) polymer containing at least about 50 mole percent of structural units of the formula



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wherein each R is independently a C_1 to C_8 aliphatic radical; a C_5 to C_7 cycloaliphatic radical; a C_1 to C_8 alkoxy radical; a C_6 to C_{12} aromatic radical or an inertly-substituted derivative of any one of them, each radical being free of a tertiary alpha-carbon atom; and each X is independently hydrogen or a halide radical at least the size of a chloride radical, with the proviso that at least one X is not hydrogen.

4,586,940

PROCESS AND APPARATUS FOR A RECOVERY OF HEAT COMPRISING A HEAT-RECOVERING ABSORPTION OF WATER VAPOR FROM GASES

Josef Stubenvoll, Poysdorf, Austria, assignor to Simmering-Graz-Pauker Aktiengesellschaft, Vienna, Austria

Filed Sep. 28, 1984, Ser. No. 655,559

Claims priority, application Austria, Sep. 29, 1983, 3462/83

Int. Cl.[4] B01D *53/14*

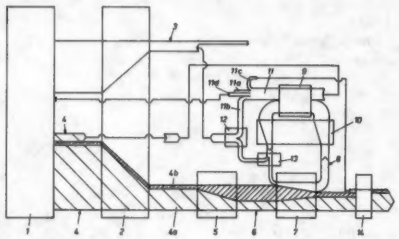
U.S. Cl. 55—32 20 Claims

1. A process for recovering heat from flue gases discharged from a flue gas treating plant, said process comprising:

(a) removing water vapor from the flue gases;

(b) recovering heat from the removed water vapor;

(c) transferring part of the recovered heat to the flue gases that remain after the water vapor removal step to reheat said gases and maintain said gases at a desired temperature; and



(d) transferring the remainder of the recovered heat to at least one fluid for subsequent transfer to a fluid employed in a separate heating process.

4,586,941

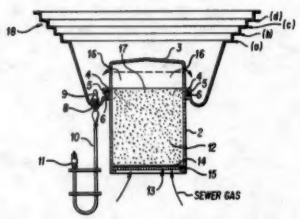
SEWER ODOR ADSORBER

Richard L. Cooley, San Mateo, Calif., assignor to Calgon Carbon Corporation, Pittsburgh, Pa.

Filed Feb. 4, 1985, Ser. No. 698,213

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—385 R 6 Claims



1. A sewer gas odor adsorption apparatus for a manhole, which is inserted into the manhole, causing it to rest on the manhole lip, and held in place by a manhole cover, which comprises: (1) a manhole adapter having a horizontal flange for resting on the manhole lip; and (2) an adsorption means containing activated carbon which is supported by said manhole adapter providing communication with the sewer, wherein the positive pressure of the sewer gas drives all of the gas to be treated through said activated carbon, thereby purifying the sewer gas.

4,586,942

PROCESS AND PLANT FOR THE COOLING OF A FLUID AND IN PARTICULAR THE LIQUEFACTION OF NATURAL GAS

Pierre Gauthier, Fresnes, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Jan. 31, 1984, Ser. No. 575,541

Claims priority, application France, Feb. 8, 1983, 83 01919

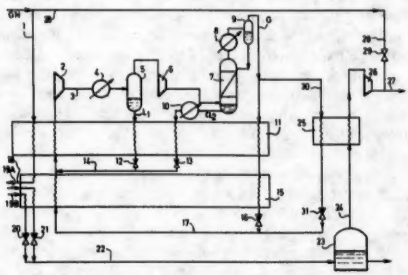
Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—28 11 Claims

1. In a process comprising cooling a fluid from about ambient temperature to a low temperature while reducing the consumption of compression energy and precluding the need to use refrigerant constituents which are liable to become solidified in the cold part of the exchange line, by providing a cooling mixture of about ambient temperature and at a first pressure, said mixture being composed of constituents of different

volatilities; compressing said mixture in at least two compression steps; after the last compression step and after at least one intermediate compression step, precooling the compressed mixture by heat exchange with a cold source at about ambient temperature to obtain a liquid fraction and a vapor fraction at about ambient temperature; sub-cooling said liquid fraction to a temperature between ambient temperature and said low temperature, expanding the same and vaporizing it in heat exchange relation with said fluid to be cooled; and liquefying and sub-cooling the last step vapor fraction to said low temperature, expanding the same and vaporizing it in heat exchange relation with said fluid to be cooled; the improvement comprising performing at least one of said precooling steps by sending the mixture compressed in the respective compression step to a distillation column, precooling to about ambient temperature by means of said cold source an overhead gas of said column to produce said vapor fraction and a reflux liquid for said column, and precooling to about ambient temperature by means of said cold source a bottom liquid of said column to produce said liquid fraction.

8. In apparatus comprising means designed for cooling a fluid from about ambient temperature to a low temperature while reducing the consumption of compression energy and precluding to need to use refrigerant constituents which are



liable to become solidified in the cold part of the exchange line, including means for providing a cooling mixture at about ambient temperature and at a first pressure, said mixture being composed of constituents of different volatilities; means for compressing said mixture in at least two compression steps; after the last compression step and after at least one intermediate compression step, means for precooling the compressed mixture by heat exchange with a cold source at about ambient temperature to obtain a liquid fraction and a vapor fraction at about ambient temperature; means for sub-cooling said liquid fraction to a temperature between ambient temperature and said low temperature and for expanding the same and vaporizing it in heat exchange relation with said fluid to be cooled; and means for liquefying and sub-cooling the last step vapor fraction to said low temperature and for expanding the same and vaporizing it in heat exchange relation with said fluid to be cooled; the improvement comprising means for performing at least one of said precooling steps by sending the mixture compressed in the respective compression step to a distillation column, means for precooling to about ambient temperature by means of said cold source an overhead gas of said column to produce said vapor fraction and a reflux liquid for said column, and means for precooling to about ambient temperature by means of said cold source a bottom liquid of said column to produce said liquid fraction.

4,586,943

METHOD FOR THE PRODUCTION OF GLASS PREFORM FOR OPTICAL FIBERS

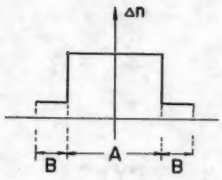
Michihisa Kyoto; Naoki Yoshioka; Gotaro Tanaka; Minoru Watanabe; Hiroshi Shimba, all of Yokohama, and Nobuo Inagaki, Katsuta, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Nippon Telegraph & Telephone Public Corporation, Tokyo, both of, Japan

Filed Oct. 16, 1984, Ser. No. 661,451

Claims priority, application Japan, Oct. 20, 1983, 58-195209; Oct. 20, 1983, 58-195210

Int. Cl.[4] C03B *37/012, 37/014*

U.S. Cl. 65—3.12 **15 Claims**



1. A method for producing a glass preform for optical fibers by heating a glass soot preform consisting of fine glass particles made substantially of silicon dioxide, wherein the formation of hydrogen fluoride by fluorine or fluorine-based treating compounds during heating is suppressed, which method comprises the steps of:

(1) heating the glass soot preform to from 800° to 1,200° C., until it is dehydrated and any volatile impurities are removed;

(2) then heating the glass soot preform at a temperature which is at most 1400° C. in a gas atmosphere containing at least fluorine or fluorine-based compound in the absence of hydrogen containing compounds to add fluorine to the glass soot preform; and

(3) then after all the fluorine has been added, heating the glass soot preform to sinter said preform into a transparent glass preform.

4,586,944

METHOD OF MANUFACTURING HOLLOW GLASS OBJECTS, AND APPARATUS FOR CARRYING OUT THE METHOD

Hendrik Romberg, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 19, 1984, Ser. No. 662,862

Claims priority, application Netherlands, Oct. 26, 1983, 8303686

Int. Cl.[4] C03B *9/38*

U.S. Cl. 65—79 **10 Claims**

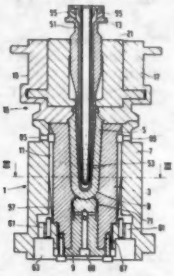
1. A method of manufacturing hollow glass objects by the press-and-blow process, comprising the steps of shaping a glass gob into an elongate parison in a preform mold; removing the parison from the preform mold and then subjecting the parison, while the parison is freely hanging by its open neck portion, to a thermal intermediate treatment and to an intermediate blowing operation; and then blowing the parison in a finish mold to form the desired glass object; and including the step, after removal of the parison from the preform mold, of subjecting the parison to an upsetting operation at its bottom part so as to obtain an given wall thickness distribution in the ultimately formed object,

characterized by comprising the steps of cooling the parison in the preform mold,

heating and then cooling the parison during said thermal intermediate treatment, and

performing said upsetting operation during the blowing step, such that a temperature distribution is obtained in the

parison with the temperature increasing from the neck portion to the bottom part, and that in the blown hollow object a wall thickness distribution is obtained having a considerable wall thickness at the wall portion having the largest transverse dimension.



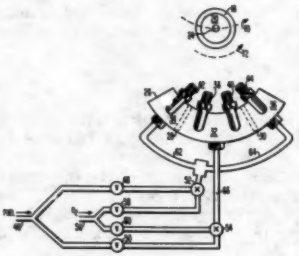
6. An apparatus as claimed in claim 5, characterized in that the insert and the mold holder are made of different materials, the material comprising the insert having a higher expansion coefficient than the material of the mold holder.

4,586,945

DUAL CONTROL BURNER MANIFOLD FOR CRT PRODUCTION

Frank S. Sawicki, Scranton; Mark D. Mital, Hughestown, and Francis J. Osborne, Archbald, all of Pa., assignors to RCA Corporation, Princeton, N.J.

Filed Sep. 21, 1984, Ser. No. 653,075
Int. Cl.[4] C03B *23/07*
U.S. Cl. 65—138 **1 Claim**



1. An apparatus for sealing a wafer in the neck of a cathode ray tube and for cutting off excess neck material, said apparatus comprising

a plurality of burners having first and second groups, said first and second groups being aimed below said wafer and at said wafer respectively, and being connected to means for providing separate first and second combustible gas mixtures to said first and said second groups, respectively, said burners being disposed in an arc wherein the outer burners comprise said first group and the inner burners comprise said second group, and

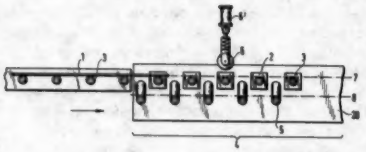
a manifold having a pair of partitions forming a central chamber of said manifold and two outside chambers of said manifold, said outside chambers respectively providing said first combustible gas mixture to said outer burners, said central chamber providing said second combustible gas mixture to said inner burners.

4,586,946

EQUIPMENT FOR CURVING GLASS SHEETS

Carl Kramer, Am Chorusberg 8, 5100 Aachen, and Karl-Heinz Dicks, Stüttegasse 6a, 5107 Lammersdorf, both of Fed. Rep. of Germany

Filed Feb. 7, 1983, Ser. No. 464,770
Int. Cl.[4] C03B *23/033*
U.S. Cl. 65—273 **14 Claims**



1. An apparatus for bending to a desired curvature a substantially planar glass sheet heated in a furnace to the softening point temperature of the glass, the apparatus comprising:

a. a shaping region having an upper level and a lower level;

b. means for advancing said planar glass sheet from said furnace to said upper level of said shaping region, said advancing means including a plurality of straight, spaced-apart first advance bars positioned outside of said shaping region and a plurality of straight, spaced-apart second advance bars positioned within said shaping region, said first and second advance bars defining a first horizontal surface aligned with said upper level, said first and second advance bars supporting said planar glass sheet and being rotatable for advancing said planar glass sheet onto said second advance bars in said shaping region, said second advance bars being lowerable to lower said glass sheet from said upper level to said lower level of said shaping region;

c. a plurality of curved, spaced-apart forming bars located in said lower level of said shaping region and defining a curved surface corresponding to said desired curvature of said glass sheet, said forming bars being aligned vertically with the spaces between said second advance bars and being rotatable for advancing said glass sheet out of said forming region as said glass sheet is being bent to said desired curvature;

d. means for lowering said second advance bars to said lower level of said shaping region, said lowered second advance bars being positioned in the spaces between said forming bars and defining a second horizontal surface aligned with the lowermost position of said curved surface defined by said forming bars; and

e. pressing means, located in said shaping region, for bending said glass sheet to said desired curvature, said pressing means being lowered from said upper level to said lower level of said forming region simultaneously with the lowering of said second advance bars and including a pressing roller positioned above and aligned with one of said second advance bars, said pressing roller being rotatable in a substantially vertical plane parallel with the advancing direction of said glass sheet and contacting said glass sheet supported on said second advance bars prior to the lowering of said second advance bars, and said pressing means further including a pressing cylinder exerting a force forcing said pressing roller to press said glass sheet against said one second advance bar aligned with said pressing roller prior to and during the lowering of said second advance bars, said glass sheet being pressed against said forming bars and bent into said desired curvature as said second advance bars are lowered to align with the lowermost position of said curved surface defined by said forming bars.

4,586,947

AZOLYL-HYDROXY ALKANOLS HAVING FUNGICIDAL AND PLANT GROWTH REGULATING PROPERTIES

Patrick J. Crowley, Crowthorne, and John C. Williams, Bracknell, both of England, assignors to Imperial Chemical Industries PLC, London, England

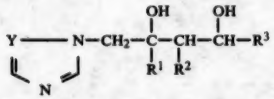
Filed Dec. 21, 1982, Ser. No. 451,763

Claims priority, application United Kingdom, Feb. 3, 1982, 8203097

Int. Cl.[4] A01N *43/50, 43/653;* C07D *233/60, 249/08*

U.S. Cl. 71—76 3 Claims

1. A compound having the formula (I):



(I)

wherein Y is =N—; R^1 is 4-chlorophenyl or 2,4-dichlorophenyl; R^2 is methyl or ethyl and R^3 is aklyl having from 1 to 4 carbon atoms, and acid addition salts, metal complexes, lower alkanoate, lower alkyl or benzyl derivatives of the hydroxy group and stereoisomers thereof.

2. A fungicidal, or plant growth regulating composition comprising an effective amount of a compound of general formula (I) as defined in claim 1 and a carrier or diluent.

4,586,948

2,4-DISUBSTITUTED-5-THIAZOLE-CARBOXYLIC ACIDS AND DERIVATIVES

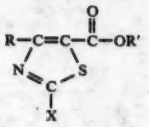
Robert K. Howe, Bridgeton, and Len F. Lee, St. Charles, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 256,326, Apr. 22, 1981, Pat. No. 4,437,875, which is a continuation-in-part of Ser. No. 140,335, Apr. 14, 1980, abandoned, which is a continuation-in-part of Ser. No. 27,959, Apr. 9, 1979, abandoned, which is a continuation-in-part of Ser. No. 906,183, May 15, 1978, Pat. No. 4,199,506. This application Mar. 16, 1984, Ser. No. 590,591

Int. Cl.[4] A01N *43/02*

U.S. Cl. 71—90 5 Claims

1. Crop seed, selected from the seed of sorghum, corn or rice, the plants grown from which are resistant to injury by an acetamide herbicide selected from the group consisting of 2-chloro-2',6'-diethyl-N-(methoxymethyl)acetanilide, 2-chloro-2',6'-diethyl-N-(butoxymethyl)acetanilide, N-(ethoxymethyl)-N-(2-ethyl-6-methyl-1-cyclohexen-1-yl)-2-chloroacetamide, N-(ethoxymethyl)-N-(2,5-dimethyl-1-cyclopenten-1-yl)-2-chloroacetamide, 2-chloro-N-(ethoxymethyl)-6'-ethyl-o-acetotoluidide, ethyl ester of N-chloroacetyl-N-(2,6-diethylphenyl)glycine, 2-chloro-2',3'-dimethyl-N-(isopropyl-)acetanilide, 2-chloro-2',6'-dimethyl-N-(1-pyrazolylmethyl-)acetanilide, 2-chloro-6'-trifluoromethyl-N-(isopropoxymethyl)acetanilide, 2-chloro-2'-methyl-6'-trifluoromethyl-N-(isopropoxymethyl)acetanilide, 2-chloro-2'-methyl-6'-trifluoromethyl-N-(isopropoxymethyl)acetanilide, 2-chloro-2'-methyl-6'-methoxy-N-(isopropoxymethyl)acetanilide, 2-chloro-2'-methyl-6'-methoxy-N-(propoxymethyl)acetanilide, 2-chloro-2'-methyl-6'-ethoxy-N-(propoxymethyl)acetanilide, 2-chloro-2'-isobutoxy-6'-ethyl-N-(ethoxymethyl)acetanilide, 2-chloro-2'-isobutoxy-6'-methyl-N-(propoxymethyl)acetanilide, and 2-chloro-2'-methyl-6'-trifluoromethyl-N-(ethoxymethyl)acetanilide, said crop seed coated with a safening effective amount of a compound having the formula



wherein X is selected from the group consisting of chloro, bromo, iodo and fluoro, R is haloalkyl having one to five carbon atoms, R' is selected from the group consisting of hydrogen, agriculturally acceptable cations, alkyl having one to ten carbon atoms, lower alkenyl, lower alkynyl, alkoxyalkyl having one to ten carbon atoms, haloalkyl having one to five carbon atoms, phenyl and phenyl substituted by one or two members independently selected from the group consisting of halogen, lower alkyl, trifluoromethyl and nitro.

4,586,949

SELECTIVE, BROADSPECTRUM WEED CONTROL IN SOYBEANS

B. Clifford Gerwick, III, Concord, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 435,194, Oct. 19, 1982, abandoned. This application Apr. 2, 1984, Ser. No. 595,786

Int. Cl.[4] A01N *43/88*

U.S. Cl. 71—91 14 Claims

1. In a method of selectively controlling broadleaf weeds and grassy weeds postemergently in a soybean crop by application of a herbicidally effective amount of a combination of a pyridyloxy(or thio)phenoxy propionic acid or an agriculturally acceptable salt, amide or, ester thereof active as a grass herbicide and 3-(1-methylethyl)-1H-2,1,3-benzothiadiazin-4(3H)-one-2,2-dioxide or an analog thereof having in the 8-position chloro, bromo, fluoro, alkyl of 1 to 8 carbon atoms or nitro, or, a salt thereof, active as a broadleaf weed herbicide, wherein the improvement comprises employing as the pyridyloxy(or thio)phenoxy propionic acid or salt, amide or ester thereof a 2-(4-(2-pyridyloxy(or thio))phenoxy)propionic acid or salt, amide or ester thereof having in the 3-position of the pyridine ring a substituent selected from the group consisting of Cl, F, Br, I, CF_3, C_1–C_4 alkyl, C_1–C_4 alkoxy and NO_2, the propionic acid or salt, amide or ester being applied at a rate in the range of about 0.03 to about 0.5 pounds per acre and the benzothiadiazinone compound being applied at a rate in the range of about 0.5 to about 1.5 pounds per acre, whereby substantially less damage to the soybean plants is exhibited than occurs when the pyridyloxy(or thio)phenoxy propionic acid or salt, amide or ester thereof has hydrogen in the 3-position of the pyridine ring.

4,586,950

NOVEL PHENYL-SUBSTITUTED SULFONAMIDES

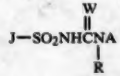
Robert J. Pasteris, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation-in-part of Ser. No. 499,443, May 31, 1982, abandoned, which is a continuation-in-part of Ser. No. 437,632, Oct. 29, 1982, abandoned. This application Sep. 20, 1983, Ser. No. 533,341

Int. Cl.[4] C07D *417/12;* A01N *47/36*

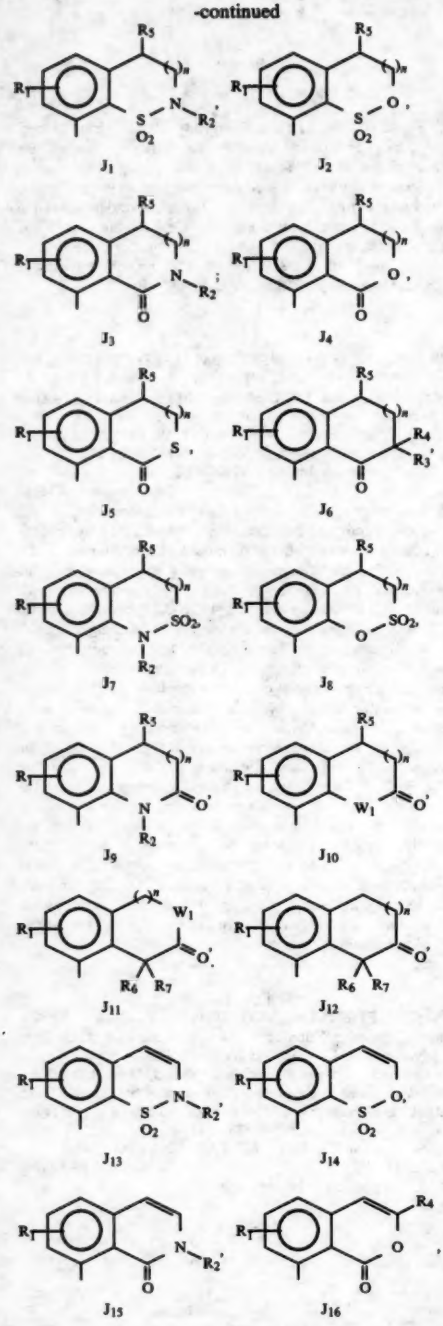
U.S. Cl. 71—92 59 Claims

1. A compound of the formula:



wherein J is

-continued



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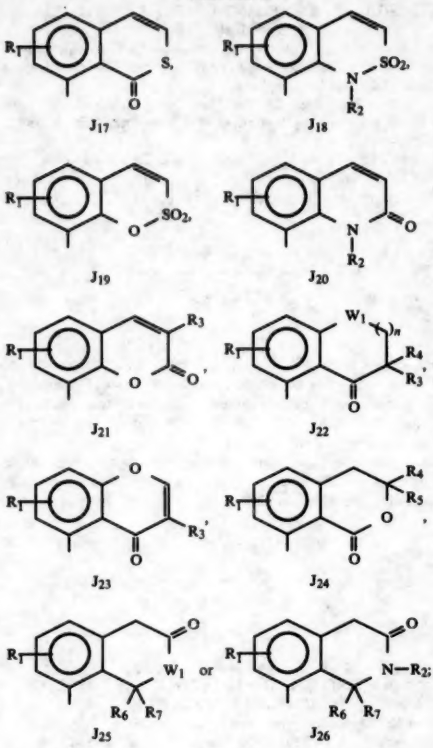
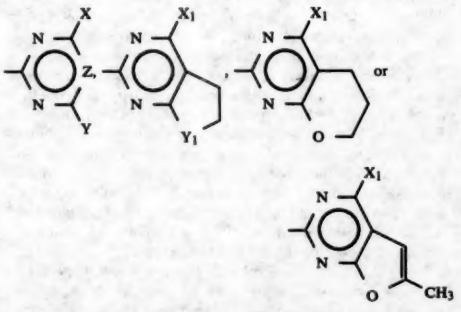
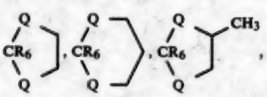


n is 0, 1 or 2
W is O or S;
W_1 is O or S;
R is H or CH_3;
R_1 is H, F, Cl, Br, CH_3, OCH_3, CF_3, SCH_3 or OCF_2H;
R_2 is H or C_1-C_4 alkyl;
R_3 and R_4 are independently H, C_1-C_4 alkyl, Cl or Br;
R_5 is H or CH_3;
R_6 is H or Ch_3;
R_7 is H or Ch_3;
A is



X is CH_3, OCH_3, OCH_2CH_3, Cl, F, Br, OCF_2H, CH_2F or CF_3;

Y is H, CH_3, OCH_3, OC_2H_5, CH_2OCH_3, NH_2, $NHCH_3$, $N(CH_3)_2$, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, OCH_2CF_3, CN, N_3, $OCH_2CH_2OCH_3$, CH_2SCH_3, $CR_6(QCH_3)_2$,



$CH_6(QCH_2CH_3)_2$ or QCF_2T where Q is O or S and T is H, CHClF, CHBrF or $CHFCH_3$;

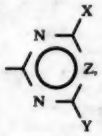
Z is CH, CCH_3, CC_2H_5, CCl or CBr;

Y_1 is O or CH_2;

X_1 is CH_3, OCH_3, OC_2H_5 or OCF_2H;

provided that

(a) when W is S, then R is H, A is



Z is CH, and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, OCH_2CF_3, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or

(b) the total number of carbon atoms in R_3 and R_4 is less than or equal to 4;

(c) when X is Cl, F or Br, then Z is CH and Y is OCH_3, OC_2H_5, NH_2, $NHCH_3$, $N(CH_3)_2$ or OCF_2H;

(d) when R_5 is CH_3, then n is O;

(e) when J is J_{24}, then R_4 and R_5 are not both H and R_4 is not Cl or Br;

and their agriculturally suitable salts.

4,586,951

HERBICIDALLY ACTIVE SUBSTITUTED PHENYLSULFONYLUREA DERIVATIVES

Masahiro Aya; Junichi Saito; Kazuomi Yasui, all of Tokyo; Kozo Shiokawa, Kanagawa; Norihisa Morishima, Tokyo, and Toshio Goto, Kanagawa, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

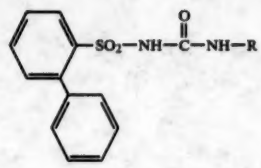
Division of Ser. No. 340,903, Jan. 20, 1982, Pat. No. 4,500,342. This application Jul. 19, 1984, Ser. No. 632,555

Claims priority, application Japan, Jan. 26, 1981, 56-8977; Jun. 20, 1981, 56-94571

Int. Cl.[4] C07D *251/46, 251/42;* **A01N** *43/66, 43/54*

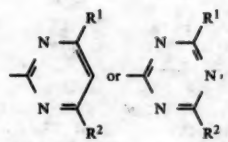
U.S. Cl. 71—92 **7 Claims**

1. In the cultivation of rice in a paddy field, the method for selectively controlling the growth of undesired plants in said field which comprises applying to the field a herbicidally effective amount of a 2-biphenylsulfonylurea derivative of the formula



in which

R is



R^1 and R^2 each independently is methyl or methoxy.

4,586,952

HERBICIDAL SULFONAMIDES

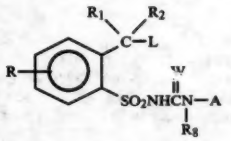
William B. Farnham, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 435,711, Oct. 21, 1982, Pat. No. 4,486,589, which is a continuation-in-part of Ser. No. 259,982, May 12, 1981, abandoned, which is a continuation-in-part of Ser. No. 168,892, Jul. 11, 1980, abandoned. This application Nov. 7, 1984, Ser. No. 669,024

Int. Cl.[4] C07D *491/098;* **A01N** *47/36*

U.S. Cl. 71—92 **7 Claims**

1. A compound selected from



wherein

L is Cl, F, Br, NR_3R_4, $N^+R_3R_4R_4'$, $N(R_4)C(O)R_5$, $N(R_4)C(O)NHR_6$ or $N(R_4)C(O)OR_7$;

R is H, F, Cl, Br, NO_2, CF_3, C_1–C_3 alkyl or C_1–C_3 alkoxy;

R_1 is H, F, Cl or C_1–C_4 alkyl;

R_2 is H or CH_3;

R_3 is H, C_1–C_4 alkyl or OCH_3;

R_4 is H or C_1–C_4 alkyl;

R_3 and R_4 can be taken together to form $-(CH_2)_4-$, $-(CH_2)_5-$ or $-(CH_2)_2O(CH_2)_2-$;

R_4' is H, CH_3 or CH_2CH_3;

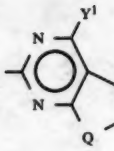
R_5 is C_1–C_4 alkyl optionally substituted with 1–3 atoms of F, Cl or Br, or C_3–C_4 alkenyl;

R_6 is H, C_1–C_4 alkyl or C_3–C_4 alkenyl;

R_7 is C_1–C_4 alkyl;

R_8 is H, CH_3 or OCH_3;

A is



W is O or S;
Y^1 is H, CH_3, OCH_3 or OCH_2CH_3; and
Q is O;
and their agriculturally suitable salts; provided that:
(1) when R_1 is Cl, then L is Cl or Br and R_2 is H;
(2) when R_3 is OCH_3, then R_4 is CH_3;
(3) when W is S, then R_8 is H; and
(4) when L is F, then R_1 is H, F, or C_1–C_4 alkyl.

4,586,953

HERBICIDAL PYRIDYLOXY PHENOXY PROPANOLS OR DERIVATIVES THEREOF HERBICIDAL COMPOSITION CONTAINING SAME AND THEIR HERBICIDAL USE

David Cartwright, Reading, England, assignor to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 286,553, Jul. 24, 1981, abandoned, which is a division of Ser. No. 165,125, filed as PCT GB 79/00023 on Feb. 5, 1979, published as WO 79/00064 on Sep. 6, 1979 § 102(e) Oct. 12, 1979, Pat. No. 4,302,242.

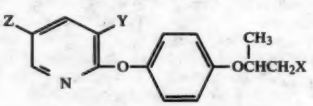
This application Jan. 31, 1984, Ser. No. 575,585

Claims priority, application United Kingdom, Feb. 15, 1978, 604/78

Int. Cl.⁴ C07D *213/64;* A01N *43/40*

U.S. Cl. 71—94 **4 Claims**

1. A herbicidal pyridine compound of the formula (I):



(I)

wherein Z is trifluoromethyl, Y is hydrogen or chlorine, and X is an $—OSO_2R^4$ group where R^4 is alkyl of 1 to 4 carbons; an $—OSO_3R^4$ group; an alkanoylamido group of 1 to 4 carbons.

4,586,954

ARYLACRYL ALIPHATIC AMIDE HERBICIDAL COMPOUNDS AND METHODS OF USE

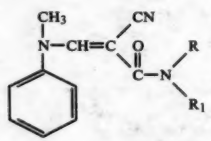
William J. Michaely, Richmond, and Jeff K. Curtis, Berkeley, both of Calif., assignors to Stauffer Chemical Co., Westport, Conn.

Filed Jun. 3, 1985, Ser. No. 740,601

Int. Cl.⁴ A01N *43/40, 43/36, 37/34*

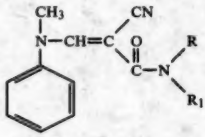
U.S. Cl. 71—94 **31 Claims**

1. A compound having the structural formula



wherein
R is selected from the group consisting of C_1–C_8 aliphatic and cycloaliphatic, C_2–C_3 haloaliphatic, C_2–C_4 alkoxyalkyl, $—CH_2CN$, $—CH(CH_3)CN$ and $—C(CH_3)_2CN$; and
R_1 is selected from the group consisting of hydrogen and C_1–C_3 alkyl, provided that both R and R_1 cannot both equal hydrogen at the same time.

17. The method of controlling undesirable vegetation comprising applying to the area where control is desired, an herbicidally effective amount of a compound having the formula



wherein
R is selected from the group consisting of C_1–C_8 aliphatic and cycloaliphatic, C_2–C_3 haloaliphatic, C_2–C_4 alkoxyalkyl, $—CH_2CN$, $—CH(CH_3)CN$ and $—C(CH_3)_2CN$; and
R_1 is selected from the group consisting of hydrogen and C_1–C_3 alkyl, provided that both R and R_1 cannot both equal hydrogen at the same time.

4,586,955

PROCESS FOR DESULPHURIZING HOT METAL

Rudolf Hammer, Dinslaken-Eppinghofen; Walter Meichsner, Krefeld, and Karl-Heinz Peters, Dinslaken-Eppinghofen, all of Fed. Rep. of Germany, assignors to Thyssen Stahl AG, Duisburg, Fed. Rep. of Germany

Filed Jun. 12, 1985, Ser. No. 743,854

Claims priority, application European Pat. Off., Jun. 28, 1984, 84107487.5

Int. Cl.⁴ C21C *7/02*

U.S. Cl. 75—53 **11 Claims**

1. A process for desulphurising hot metal in a ladle which comprises adding aluminum to the hot metal, and then blowing into the hot metal a carrier gas containing lime and a compound which decomposes upon contact with the hot metal thereby generating gas.

4,586,956

METHOD AND AGENTS FOR PRODUCING CLEAN STEEL

Micheal D. Labate, 115 Hazen Ave., Ellwood City, Pa. 16117

Filed Jul. 17, 1985, Ser. No. 755,724

Int. Cl.⁴ C21C *7/02*

U.S. Cl. 75—58 **6 Claims**

1. A process for treating molten steel to remove insoluble non-metallic inclusions, sulphur and aluminum oxide therefrom, which includes the steps of tapping a heat of molten steel into a ladle and sequentially adding a desulphurization compound consisting of equal parts of calcium fluoride, sodium carbonate, and calcium hydroxide, adding granular metallic aluminum as a deoxidizing reactant agent, adding equal parts of calcium oxide and an aluminum alloy, the major portion of which is aluminum and a minor portion magnesium, as a slag conditioning compound, adding burnt lime, aluminum dross, flurospar and acid treated graphite as an expandable ladle covering compound and injecting an inert gas sufficient to create turbulence and stirring motion in the molten steel and adding additional granular metallic aluminum, the desulphurization compound being added with the first volume of steel tapped into the ladle, the first mentioned deoxidizing reacting agent, and the slag condition compound being added when approximately one-half of the volume of steel is tapped into the ladle, the expandable ladle covering compound being added immediately thereafter and the second mentioned granular metallic aluminum as a deoxidizing reactant agent being added after the addition of the expandable ladle cover compound and before the full volume of steel is tapped into the ladle whereby said turbulence forces chemically and physical contact of all of said insoluble metallic inclusions and the free sulphur and free aluminum oxide to rise to the top of the ladle and be absorbed

in the expandable ladle covering compound so that clean molten steel can be withdrawn from the ladle below said expandable ladle covering compound.

4,586,957

IRON-BASE ALLOY MATERIALS HAVING EXCELLENT WORKABILITY

Tsuyoshi Masumoto, No. 8-22, Kamisugi 3-chome, Sendai-shi, Miyagi; Akihisa Inoue, Miyagi, and Hiroyuki Tomioka, Kyoto, all of Japan, assignors to Tsuyoshi Masumoto and Unitika Ltd., both of, Japan

Filed Mar. 1, 1984, Ser. No. 585,097

Claims priority, application Japan, Mar. 1, 1983, 58-33140

Int. Cl.[4] C22C *38/06, 38/18, 38/40*

U.S. Cl. 75—124 **19 Claims**

1. An Fe—Cr alloy material having excellent workability, consisting essentially of:

2 to 60 atomic percent of at least one metal selected from the group consisting of Ni and Mn;

7.5 to 60 atomic % of Cr;

0.5 to 12 atomic % of Al;

0.5 to 10 atomic % of at least one element selected from the group consisting of C, B, and P; and

the balance consisting substantially of Fe;

wherein said alloy material has a texture of a non-equilibrium crystalline phase.

4,586,958

PROCESS FOR PRODUCING A FIRE-RESISTANT, LIGHT-WEIGHT CONSTRUCTION BOARD

Sadaji Matsuura, Numazu; Yasuo Arai, Kunitachi; Shigeki Aoki, Tokyo, and Satoru Ando, Fuji, all of Japan, assignors to Fuji Fire-Proof Material Industry Co., Ltd., Shizuoka, Japan

Filed Jan. 26, 1984, Ser. No. 574,261

Claims priority, application Japan, Jan. 26, 1983, 11058; Jan. 26, 1983, 11059

Int. Cl.[4] C09D *5/14*

U.S. Cl. 106—15.05 **10 Claims**

1. A process for producing a fire-resistant, light-weight construction board which comprises:

subjecting fly ash and paper sludge or paper sludge incineration ash or a mixture of fly ash and paper sludge incineration ash to a swelling treatment with a mineral acid to prepare a slurry;

adding to the slurry a slurry hardener and kneading the mixture; and

shaping and hardening the kneaded mixture to obtain the fire-resistant, light-weight construction board.

4,586,959

COMPOSITION FOR FACING IN THE BUILDING FIELD

Jean Rivoallon, Compiegne, France, assignor to Societe Francaise Hoechst, Puteaux, France

Filed Feb. 5, 1985, Ser. No. 698,537

Claims priority, application France, Feb. 6, 1984, 84 01764; Jan. 15, 1985, 85 00521

Int. Cl.[4] C09D *1/02*

U.S. Cl. 106—84 **16 Claims**

1. A composition intended for the preparation of facings by spraying by means of a hose a mixture comprising rock wool (A), the composition having an almost instantaneous setting time and a formulation necessarily comprising a combination of: (1) at least one powder product (B) consisting essentially of at least 30% of sodium or potassium bicarbonate, and a compound selected from the group consisting of calcium chloride, sulfamic acid and sodium bicarbonate, and optionally a solid silicate of sodium or potassium, and (2) an amount sufficient to almost instantaneously set the composition of at least an aqueous solution (C) of sodium or potassium silicate.

4,586,960

CEMENT ADMIXTURE

Masanori Iizuka, and Hideki Tanaka, both of Wakayama, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jun. 26, 1984, Ser. No. 624,634

Claims priority, application Japan, Jul. 8, 1983, 58-124339

Int. Cl.[4] C04B *24/04*

U.S. Cl. 106—90 **23 Claims**

14. A process for preparing a hydraulic cement composition having improved workability and stable fluidity, which comprises:

mixing with hydraulic cement, 0.03 to 2% by weight of said cement of particles of a water-insoluble copolymer obtained by copolymerizing a first, ethylenically unsaturated, dicarboxylic acid anhydride monomer, with a second monomer selected from the group consisting of ethylene, propylene, n-butene, isobutylene, n-pentene, cyclopentene and 2-methyl-1-butene, said water-insoluble copolymer having a particle size in the range of from 0.1 to 1000 micrometers, said water-insoluble copolymer having a molecular weight in the range of 500 to 20000.

15. A process as claimed in claim 14, in which the molar ratio of said first monomer to said second monomer is from 4/6 to 6/4.

4,586,961

METHODS AND COMPOSITIONS FOR REMOVING COPPER AND COPPER OXIDES FROM SURFACES

Gary W. Bradley, and Stephen T. Arrington, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Feb. 15, 1985, Ser. No. 701,899

Int. Cl.[4] C23G *1/02*

U.S. Cl. 134—2 **15 Claims**

1. A method of removing copper and copper oxide deposits from austenitic or nickel-chromium alloy surfaces containing such deposits comprising contacting said deposits with an aqueous ammoniacal solution consisting essentially of a water soluble perborate oxidizing agent.

4,586,962

SURFACE CLEANING PROCESS

Eugene S. Barabas, Watchung, N.J., assignor to GAF Corporation, Wayne, N.J.

Continuation-in-part of Ser. No. 538,954, Sep. 27, 1983, Pat. No. 4,521,253, and Ser. No. 454,127, Dec. 29, 1982, Pat. No. 4,451,296. This application May 10, 1984, Ser. No. 608,690

Int. Cl.[4] B08B *7/00*

U.S. Cl. 134—4 **7 Claims**

1. Process for removing particulate contaminant from a surface contaminated with such contaminant by means other than chemical reaction between material of the surface and chemicals of the environment, which process comprises:

(a) applying to such contaminated surface a layer of surface cleaning composition consisting essentially of an aqueous solution or dispersion of water soluble or water dispersible copolymer of maleic acid and vinylpyrrolidone monomer; and

(b) allowing said layer of cleaning composition to dry whereby particulate contaminant becomes incorporated into said layer and the layer containing the particulate contaminant detaches itself from the surface.

4,586,963

PROTECTIVE COATING COMPOSITION AND METHOD OF USE THEREFOR

Noel A. Smith, and William J. Avallone, both of Troy, Mich., assignors to Saran Protective Coating Company, Detroit, Mich.

Continuation of Ser. No. 368,718, Apr. 15, 1982, Pat. No. 4,440,582. This application Mar. 9, 1984, Ser. No. 588,009
Int. Cl.[4] C10M 3/14
U.S. Cl. 148—6.15 R 7 Claims

1. An aqueous coating composition for improving corrosion resistance of metal parts, consisting essentially of:

(a) from about 5% to about 35%, by volume, of the phosphating oil,

(b) from about 0.1% to about 25% by volume, of the siloxane, and

(c) from about 90% to about 50% by volume, of water.

4,586,964

CORROSION RESISTANT VACUUM BRAZING SHEET

Walter D. Finnegan, Walnut Creek, and Ralph A. A. Woods, Pleasanton, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Jul. 26, 1984, Ser. No. 634,529
Int. Cl.[4] C21D 8/00
U.S. Cl. 148—11.5 A 19 Claims

10. A method of producing a brazed aluminum composite sheet product having improved resistance to intergranular corrosion, which comprises:

(a) cladding an aluminum-base core material containing at most a trace amount of chromium with an aluminum-base brazing alloy containing silicon as a primary alloying element to form a composite having a cladding occupying from about 1% to about 15% of the total composite thickness;

(b) rolling said composite to form a sheet product;

(c) annealing said sheet product to a substantially strain-free state;

(d) cold working said sheet product to a reduction of from about 3% to about 20%; and

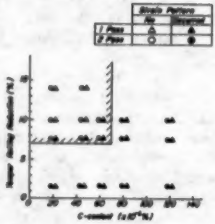
(e) joining said sheet product at its clad surface to a second aluminum-base material by vacuum brazing.

4,586,965

PRODUCTION OF A BASE STEEL SHEET TO BE SURFACE-TREATED WHICH IS TO PRODUCE NO STRETCHER STRAIN

Takashi Obara; Kazunori Osawa; Minoru Nishida; Kei Sakata, and Hideo Kuguminato, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed May 31, 1985, Ser. No. 739,623
Claims priority, application Japan, Jun. 8, 1984, 59-116612
Int. Cl.[4] C21D 9/46
U.S. Cl. 148—12 D 1 Claim



1. A method of manufacturing a base steel sheet for plating, which method comprises combined steps of:

hot rolling steel slab containing not more than 0.0070% by weight of C, not more than 0.1% by weight of Si, not more than 0.5% by weight of Mn, 0.010 to 0.080% by weight of Al, not more than 0.0050% by weight of N, not more than 0.030% by weight of S provided that the ratio of Mn/S is not less than 10, and not more than 0.030% by weight of P while the hot rolling being terminated at a finish temperature of not less than 800° C.;

cold rolling thus obtained hot rolled steel sheet in an ordinary manner;

continuously annealing the cold rolled steel sheet in which heating is done up to a temperature from a recrystallization temperature to 800° C., followed by cooling; and

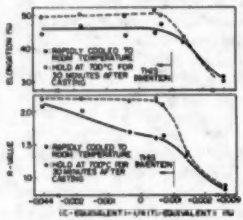
then temper rolling the annealed steel sheet at a reduction of not less than 7% by using two or more stand rolling mill.

4,586,966

METHOD OF PRODUCING COLD-ROLLED STEEL SHEET EXHIBITING IMPROVED PRESS-FORMABILITY

Atsuki Okamoto, Ashiya, and Masashi Takahashi, Kawanishi, both of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Mar. 21, 1984, Ser. No. 591,815
Claims priority, application Japan, Mar. 25, 1983, 58-049996
Int. Cl.[4] C21D 7/02, 9/46, 9/48
U.S. Cl. 148—12 C 10 Claims



1. A method of producing a cold-rolled steel sheet having improved press-formability, which comprises preparing a molten steel having the following chemical composition:

C: 0.001–0.015%,

Mn: 0.01–1.20%,

sol. Al: not more than 0.10%,

N: not more than 0.0060%, at least one element selected from the group consisting of:

Ti: not more than 0.20%,

Nb: not more than 0.20%, and

Zr: not more than 0.20%, and the balance iron and incidental impurities, with the Ti-equivalent defined by the following Formula (1) and the C-equivalent defined by the following Formula (2) satisfying the relationship defined by Formula (3) below:

$$\text{Ti-equivalent} = \text{Ti}(\%) + 48/93\text{Nb}(\%) + 48/91\text{Zr}(\%) \quad (1)$$

$$\text{C-equivalent} - \text{C}(\%) + 12/14\text{N}(\%) \quad (2)$$

$$(\text{C-equivalent}) - \tfrac{1}{4}\,(\text{Ti-equivalent}) \leq 0.0010\ (\%) \quad (3)$$

rapidly cooling the thus prepared molten steel to continuously produce a thin cast plate, coiling the thus produced plate at a temperature of 500°–800° C., and applying cold rolling and then recrystallization annealing to the cast plate after uncoiling said method being carried out without a hot rolling step.

4,586,967

COPPER-TIN ALLOYS HAVING IMPROVED WEAR PROPERTIES

Eugene Shapiro, Hamden, and Frank N. Mandigo, Northford, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Division of Ser. No. 595,763, Apr. 2, 1984, Pat. No. 4,511,410. This application Nov. 23, 1984, Ser. No. 673,977
Int. Cl.[4] C22C 9/02
U.S. Cl. 148—31.5 5 Claims

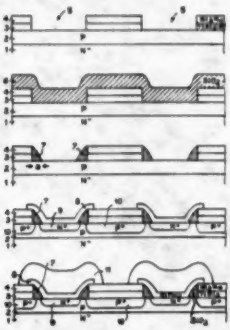
1. A copper-tin alloy having a lubricating type, discontinuous film on at least one surface to improve wear performance, said alloy consisting essentially of about 2% to about 11% tin, about 0.03% to about 0.75% phosphorous and the balance essentially copper; and said film being formed by subjecting said alloy to a heat treatment at a temperature in the range of about 400° C. to about 650° C. in an atmosphere having a dew point in the range of about −75° C. to about +95° C. and an oxygen level less than about 300 ppm.

4,586,968

PROCESS OF MANUFACTURING A HIGH FREQUENCY BIPOLAR TRANSISTOR UTILIZING DOPED SILICIDE WITH SELF-ALIGNED MASKING

Augustin Coello-Vera, Charentilly la Membrolle, France, assignor to Le Silicium Semiconducteur SSC, Paris, France

Filed Jul. 6, 1984, Ser. No. 628,408
Claims priority, application France, Jul. 13, 1983, 83 11737
Int. Cl.[4] H01L 21/225, 21/283
U.S. Cl. 148—188 4 Claims



1. A process for manufacturing a high frequency bipolar transistor having interdigitated base and emitter regions and having conductive layers extending over the interdigitated base and emitter regions to improve conductivity of said regions, said process comprising the following steps:

forming on a silicon substrate of a first conductivity type a first layer of silicide strongly doped with an impurity of said first conductivity type,

depositing a second layer of a first insulating substance,

etching said first and second layers to define narrow parallel openings corresponding to desired locations for emitter regions, said opening being separated by narrow parallel strips of metallic silicide covered by said insulating substance, said strips corresponding to desired locations for base regions interdigitated with said emitter regions,

uniformly depositing a third layer of a second insulating substance covering said openings and said strips,

anisotropically etching said third layer so as to remove said insulating substance from horizontal surfaces in said openings and on said strips while leaving ribbons of said second insulating substance on vertical edges of said strips,

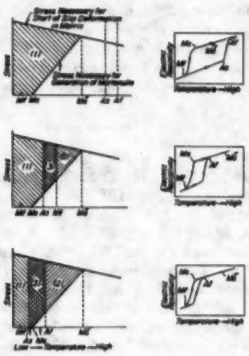
introducing impurities of a second conductivity type opposite to said first type in said openings between said ribbons of insulating substance and heating the substrate to diffuse in the substrate said impurity contained in the metal silicide, so as to form base regions under said strips.

4,586,969

FE-NI-TI-CO ALLOY WITH SHAPE MEMORY EFFECT AND PSEUDO-ELASTICITY AND METHOD OF PRODUCING THE SAME

Imao Tamura, Kyoto, and Tadashi Maki, Settsu, both of Japan, assignors to Kyoto University, Kyoto, Japan

Filed Mar. 14, 1985, Ser. No. 711,810
Claims priority, application Japan, May 9, 1984, 59-90874
Int. Cl.[4] C22C 38/08, 30/00
U.S. Cl. 148—402 2 Claims



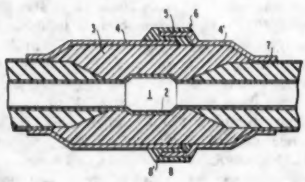
1. An Fe—Ni—Ti—Co alloy with a shape memory effect and a pseudo-elasticity consists of 32–34 wt. % of nickel, 3–6 wt. % of titanium, 10–15 wt. % of cobalt and the remainder of Fe, said alloy having a thin-plate martensitic structure.

4,586,970

METHOD OF FORMING AN INSULATED CONDUCTOR SPLICE UTILIZING HEAT SHRINKABLE TUBES

Kojiro Ishise, and Keiichi Kojima, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 366,964, Apr. 9, 1982, abandoned, which is a continuation of Ser. No. 168,228, Jul. 10, 1980, abandoned. This application May 30, 1985, Ser. No. 739,353
Claims priority, application Japan, Jul. 10, 1979, 54-87641; Jul. 10, 1979, 54-87642
Int. Cl.[4] B21F 15/06; H01R 4/00, 43/033
U.S. Cl. 156—48 16 Claims



1. A method for forming a connection between cables or wires wherein said cables or wires are comprised of a conductor surrounded by a first semiconductor layer, surrounded by an insulator layer, surrounded by a second outer semiconductor layer, said method comprising the steps of:

positioning the ends of two cables in electrical contact with an electrical conductor;

applying a cross-linkable reinforcing insulation layer around said electrical conductor and around said insulator layer of each of said cables or wires;

providing a heat shrinkable tube around said reinforcing insulating layer and around the outer semiconductor layer

of each of said cables or wires, said tube comprising an integrated assembly of a semiconductive member and a specific insulated portion containing insulation material, said tube comprising two cylindrical heat shrinkable semiconductive members combined with each other but electrically separated from each other by said insulation material of the specific insulated portion; and

heating said tube under pressure in order to cross-link said reinforcing insulation layer and cause said reinforcing insulation layer to become integrated with said heat shrinkable tube and electrically bond said semiconductive members of said tube to said outer semiconductor layer of each of said cables or wires.

5. The method of claim 1, wherein said two heat shrinkable semiconductive members are combined such that they overlap each other partly.

4,586,971

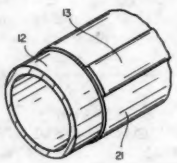
METHOD OF JOINING HEAT SHRINKABLE CLOSURE MEMBERS

Barnie A. Wallace, Jr., Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 290,056, Aug. 4, 1981, abandoned, which is a continuation of Ser. No. 172,394, Jul. 25, 1980, abandoned, which is a continuation-in-part of Ser. No. 154,763, May 30, 1980, abandoned, which is a continuation-in-part of Ser. No. 58,743, Jul. 19, 1979, abandoned. This application May 16, 1984, Ser. No. 610,557

Int. Cl.⁴ B32B *31/26*

U.S. Cl. 156—85 **20 Claims**



1. A process of covering a substrate which comprises

(1) overlappingly wrapping a heat-shrinkable polymeric closure member in sheet form around an elongate substrate;

(2) placing a crosslinked polymeric patch member over the exposed edge and outwardly disposed adjacent portions of the sheet in the area of the overlap; said patch member having a thickness of from about 10 to about 100 mils, a modulus at 150° C. of from about 10 to about 200 psi and an elongation at 150° C. of from about 10 to about 1000%;

(3) interposing between the closure and patch members a layer of a hot melt adhesive 5 to 100 mils thick; said adhesive being from about 5 to about 100 mils thick having a lap shear strength at 150° C. of from about 0.3 to about 20 psi, a peel strength of at least 5 pli, a melt viscosity at 150° C. of at least about 10^2 poise and a tack temperature which is below the recovery temperature of said closure member;

(4) heating the said hot melt adhesive to its tack temperature and pressing the patch member against the closure member, thereby bonding them together; and

(5) heating the closure member to cause shrinkage thereof into circumferential contact with the substrate to conform generally to the shape of the substrate causing the patch member to stretch by at least 5% in the direction of shrinkage.

the method being carried out under conditions such that (a) said patch member remains bonded to said closure member throughout at least the major portion of its length in the overlap area; and (b) at least part of said patch member is stretched by at least about 5% up to about 50% in the transverse direction.

4,586,972

METHOD FOR MAKING MULTILAYER CERAMIC BODY

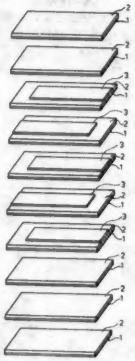
Yoichirou Yokotani, Ibaraki; Junichi Kato; Masamitsu Nishida, both of Osaka; Hiromu Ouchi, Toyonaka, and Tsuneharu Nitta, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 4, 1984, Ser. No. 596,591

Claims priority, application Japan, Apr. 5, 1983, 58-60203; Oct. 15, 1983, 58-191673

Int. Cl.⁴ B32B *31/26*; C04B *37/00*

U.S. Cl. 156—89 **4 Claims**



1. Method for making a multilayer ceramic body comprising the step of:

(a) forming at least a ceramic green layer on an organic films having thermo-plasticity for supporting only the ceramic green layer,

(b) printing at least one layer to become an electrode layer of a predetermined pattern on a surface opposite to the surface on which said ceramic green layer is formed,

(c) laminating a plurality of additional organic films similar to said orgainic film, each of said additional organic films having associated therewith another of said ceramic green layers thereon and another of said printed layers to form an electrode, to produce a laminated body, each of said printed layers being disposed between adjacent ceramic green layers in said laminated body,

(d) hot-pressing said laminated body, thereby melting the organic films to impregnate the melted organic films into said adjacent ceramic green layers and said printed layers to become an electrode thereby directly bonding said ceramic green layers to the adjacent layers to become the electrodes, said hot-pressing being conducted at a temperature of at most 50° C. below the melting point of said organic film, and

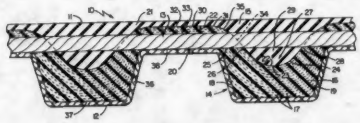
(e) sintering the laminated body thereby making a multilayer ceramic body having a plurality of electrode layers disposed parallel to each other with predetermined gaps inbetween.

4,586,973

METHOD OF MAKING BELT

Richard L. Marsh, and Robert E. Wetzel, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 502,777, Jun. 9, 1983, Pat. No. 4,504,342.
This application Jan. 14, 1985, Ser. No. 691,241
The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.
Int. Cl.[4] B29H 7/22; F16G 1/00
U.S. Cl. 156—140 12 Claims



1. In a method of making a belt construction having opposed sides and comprising a tensile member intermediate said opposed sides, a plurality of teeth defining one of said opposed sides of said belt construction and being mainly formed of a first polymeric material that has reinforcing fibers disposed substantially homogeneously therein, each tooth having opposed sides that are disposed in spaced relation to adjacent sides of adjacent teeth, and a backing member defining the other of said opposed sides of said belt construction, said backing member being mainly formed from a second polymeric material that is initially separate from said material of said teeth, said material of said backing member having a surface that joins with a surface of each tooth whereby said joining surfaces define an interface line therebetween, said interface line for each tooth extending from said tensile member at a point inboard of one of said opposed sides of the respective tooth into the medial portion of said respective tooth and then back to said tensile member at a point inboard of the other of said opposed sides of said respective tooth whereby part of said material of said backing member defines part of the medial portion of each tooth, the improvement comprising the steps of providing a grooved drum, disposing said tensile member about said drum, then disposing said first polymeric material about said tensile member, then disposing said second polymeric material about said first polymeric material whereby said second polymeric material is still separate from said first polymeric material, and then subjecting said drum to heat and pressure to cause said first and second materials to be forced toward said drum whereby said first material exudes through said tensile member adjacent said grooves and into said grooves and said second material exudes through said tensile member adjacent said grooves and into said grooves to define said interface line for each tooth and whereby said first and second materials form said interface line in each land area to have a portion thereof disposed spaced from said tensile member on the side thereof opposite to the side thereof that faces toward said teeth.

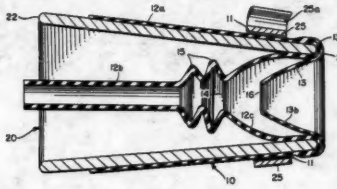
4,586,974

PROCESS OF FORMING AN EXTERNAL MALE CATHETER AND APPLICATOR

Wilford O. Nystrom, Mundelein; Kenneth E. Riedel, Naperville, and David L. Doerschner, Rolling Meadows, all of Ill., assignors to Hollister Incorporated, Libertyville, Ill.

Division of Ser. No. 510,904, Jul. 5, 1983, Pat. No. 4,540,409.
This application Apr. 24, 1985, Ser. No. 726,677
Int. Cl.[4] A61F 5/44; B32B 31/00
U.S. Cl. 156—165 6 Claims

1. A method for adhesively coating the inner surface of an external catheter having a sheath of thin, stretchable, elastic material, said sheath having a generally cylindrical section merging at one end with a tapered neck section terminating in an outlet section of reduced diameter, comprising the steps of inserting the neck and outlet sections of said sheath axially into one end of a relatively rigid open-ended tube and then folding said cylindrical section back along the outer surface of said tube to support said cylindrical section in stretched condition with its inner surface in everted and exposed condition, and



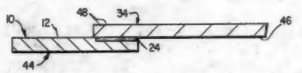
then applying a layer of pressure-sensitive adhesive to the exposed inner surface of the everted cylindrical section supported by said tube.

4,586,975

METHOD OF AND APPARATUS FOR FACILITATING THE AUTOMATIC PROCESSING OF CHECKS

Steven C. Derby, Farmers Branch, Tex., assignor to Check-Strip Ltd., Garland, Tex.

Continuation of Ser. No. 529,748, Sep. 6, 1982, abandoned. This application Sep. 27, 1984, Ser. No. 655,982
Int. Cl.[4] B31C 13/00; B31F 1/07
U.S. Cl. 156—191 13 Claims



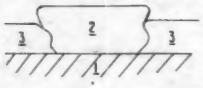
1. A method of re-encoding checks comprising the steps of:
providing a length of material having an outside surface adapted to receive re-encoding indicia thereon;
mechanically compressing the outside surface of the length of material along one edge thereof to provide an indented zone which is substantially displaced inwardly from the outside surface of the length of material;
forming an adhesive layer in the indented zone of the length of material having an outside surface which is substantially coplanar with the outside surface of the length of material;
winding the length of material having the adhesive layer formed thereon into a roll;
unwinding the length of material having the adhesive layer thereon from the roll and positioning the leading edge of the length of material adjacent the bottom edge of a check with the adhesive layer positioned beneath the reverse side of the check;
utilizing the adhesive layer to secure a portion of the length of material to the reverse side of the check with the outside surface of the length of material positioned in a substantially spaced apart relationship relative to the face of the check;
severing the trailing end of the length of material from the remainder thereof; and
subsequently forming encoding indicia on the outside surface of the length of material.

4,586,976

PROCESS FOR PRODUCING PRINTED-WIRING BOARD

Satoshi Takano, Osaka, and Tadashi Azumakawa, Aichi, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Sep. 17, 1982, Ser. No. 419,278
Claims priority, application Japan, Sep. 18, 1981, 56-148332
Int. Cl.[4] B44C *1/16;* B32B *9/04, 31/00;* H01R *43/00*
U.S. Cl. 156—233 7 Claims



1. A process for producing a printedwiring board, comprising the steps of:

providing a carrier support surface comprised of a metal;

forming a resist pattern on the metal surface, the resist pattern being formed of a composition containing 50% or more of a silicone rubber having rubbery elasticity and a Young's modulus of up to 10^3 dyn/cm^2, a tensile strength of 20 to 200 kg/cm^2, and an elongation of 100 to 500%:

metal plating the metal surface where there is no resist to provide metal plated surface portions;

contact bonding the metal plated surface portions to an insulating base material; and

transferring the metal plated surface portions onto the insulating base material, thus forming a conductor pattern on the insulating base material and forming the printed-wiring board.

4,586,977

METHOD OF BONDING A HIGH TEMPERATURE RESISTANT POLYMERIC MATERIAL TO AN ALUMINUM BASE SUBSTRATE

Kenneth J. Adams, Novelty, and David E. Dyke, Shaker Heights, both of Ohio, assignors to Imperial Clevite Inc., Glenview, Ill.

Filed Apr. 3, 1984, Ser. No. 596,359
Int. Cl.[4] C09J *5/02;* C23C *22/67;* B05D *5/10*
U.S. Cl. 156—308.6 16 Claims

9. A method of treating an aluminum base substrate to render it suitable for bonding a high temperature resistant polymeric material thereto which comprises:

providing an aqueous alkaline bath containing an alkali metal chromate salt selected from the group consisting of sodium, potassium, cesium, rubidium, and mixtures thereof of chromic acid, and in addition to said chromate salt, an alkali metal carbonate, with the alkali metal being selected from the group consisting of sodium, potassium, cesium, rubidium and mixtures thereof, in a ratio of said carbonate to said chromic salt from 3 to 1 up to 9 to 1 wherein the carbonate concentration is at least about 0.0625 mole/liter, and from about 0.0005 mole/liter up to its saturation point in the bath of a water soluble salt of an alkaline earth metal selected from the group consisting of calcium, barium, strontium and mixtures thereof;

immersing the portion of the aluminum base substrate which is to be coated with the polymer material in the bath for a period of time and at a temperature sufficient to cause a surface conversion coating to form on the exposed surface of the substrate; and,

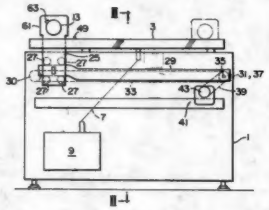
removing the substrate from the aqueous bath after the formation of the conversion coating thereon.

4,586,978

PROOFING APPARATUS

Shuzi Kondo, Kyoto; Iwao Hirose, and Masayoshi Wakabayashi, both of Shiga, all of Japan, assignors to Dainippon Screen Seizo Kabushiki Kaisha, Japan

Filed Aug. 13, 1984, Ser. No. 640,342
Claims priority, application Japan, Feb. 16, 1984, 59-26122
Int. Cl.[4] G03B *27/02*
U.S. Cl. 156—540 10 Claims



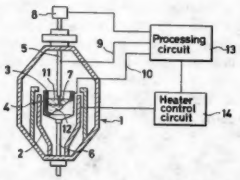
1. A proofing device comprising a table for mounting a ground paper or a proofing film thereon, a positioning pin adapted to protrude into a punch hole formed through a proofing film or a ground paper for positioning the ground paper or the proofing film on said table, an absorbing groove provided on an upper surface of said table, means for applying suction to said absorbing groove for fixedly holding by suction a ground paper or a proofing film on said table, and a heating means to heat a proofing film and being movably mounted on said table.

4,586,979

METHOD FOR MANUFACTURE OF III-V GROUP COMPOUND SEMICONDUCTOR SINGLE CRYSTAL

Tooru Katsumata, Yokohama; Kazutaka Terashima, Ebina; Hiroaki Nakajima, Yokosuka, and Tsuguo Fukuda, Yokohama, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Apr. 4, 1984, Ser. No. 596,705
Claims priority, application Japan, Apr. 4, 1983, 58-57925; Apr. 4, 1983, 58-57926; Apr. 4, 1983, 58-57927; Apr. 4, 1983, 58-57928
Int. Cl.[4] C30B *27/02*
U.S. Cl. 156—601 6 Claims



1. A method for manufacturing a III–V group compound semiconductor single crystal by bringing a seed crystal into contact with a fused layer of raw material for said single crystal kept sealed with a liquid encapsulant at high temperature under high pressure, adjusting the temperature of a heater serving to heat said fused layer and pulling up said seed crystal from said fused layer at a prescribed rate, which method comprises:

measuring said seed crystal in weight and concurrently causing an electric current to flow between said seed crystal and said fused layer to obtain a weight signal and an electric current signal and, based on said weight signal and said electric current signal, detecting occurrence of contact between said seed crystal and said fused layer,

continuously measuring said weight signal and said electric current signal over a prescribed length of time following said contact between said seed crystal and said fused layer to obtain respective time-course change patterns and comparing said time course-change patterns with standard patterns,

adjusting the temperature of said heater by a temperature compensation value corresponding to a difference found by the comparison, thereby adjusting the temperature of said fused layer to a level optimum for said prescribed rate of pulling up said seed crystal, and

pulling up said seed crystal at said prescribed rate to sequentially form shoulder part, barrel part and tail end of said single crystal.

4,586,980

PATTERN FORMING METHOD

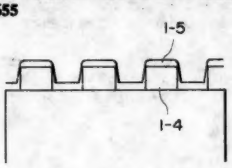
Yutaka Hirai, Tokyo; Yoshinori Tomida; Hiroshi Matsuda, both of Yokohama, and Yukuo Nishimura, Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 15, 1985, Ser. No. 702,217

Claims priority, application Japan, Feb. 20, 1984, 59-28793

Int. Cl.[4] C23F *1/00*; H01L *21/306*; B44C *1/22*; C03C *15/00*

U.S. Cl. 156—655 **9 Claims**



1. A pattern forming method, wherein a pattern of a monomolecular film or a monomolecular built-up film is formed on a base through the steps of providing a lift-off layer on a base on which a monomolecular film or a monomolecular built-up film is to be deposited, depositing the monomolecular film or the monomolecular built-up film on the base and the lift-off layer, and removing the lift-off layer from the base.

4,586,981

METHOD OF CONTINUOUS DECONTAMINATION OF RADIOCONTAMINATED LIQUIDS BY DISTILLATION

Evgeny K. Golubev; Alexandr R. Lensky; Evgeny E. Glazov; Vladimir A. Berseniev, all of Moscow; Boris F. Vakulenko; Vasily S. Mikhailov, both of Taganrog, and Anatoly A. Shiryaev, Moscow, all of U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatelsky Proektno-Konstruktorsky Institut Atomnogo Energeticheskogo Mashinostroenia, Moscow, U.S.S.R.

Filed Aug. 5, 1983, Ser. No. 520,817

Int. Cl.[4] B01D *1/06*

U.S. Cl. 159—47.1 **1 Claim**

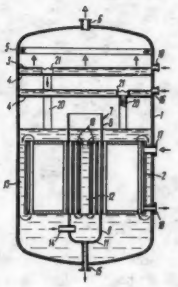
1. A method of continuous evaporation of liquid containing radioactive materials so as to produce vapor reduced of its content of radioactive materials as compared to the starting liquid, which comprises the following steps:

continuously feeding a liquid which contains radioactive materials to a first evaporation zone isolated from the outside for increasing the concentration or radioactive materials in this liquid;

continuously feeding the liquid being treated from said first evaporation zone to a second evaporation zone for increasing still further the concentration of radioactive materials in the liquid as compared with the first evaporation zone, said second evaporation zone being surrounded by said first evaporation zone;

using the liquid being treated supplied to said first evaporation zone, which is in fact an outer evaporation zone, as a body of liquid preventing the passage of radioactive radiation from said second evaporation zone, which is in fact an inner evaporation zone, to the outside;

discharging the liquid containing concentrated radioactive materials from said inner evaporation zone;



washing vapor generated in said outer and inner evaporation zones to remove therefrom radioactive materials and discharging the thus washed vapor.

4,586,982

PROCESS FOR THE DE-INKING OF PRINTED WASTE PAPER

Günter Poppel, Duren, and Hasan Ulubay, Kreuzau, both of Fed. Rep. of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Continuation of Ser. No. 388,391, Jun. 14, 1982, abandoned. This application Aug. 27, 1984, Ser. No. 644,655

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1981, 3123353

Int. Cl.[4] D21C *5/02*

U.S. Cl. 162—5 **20 Claims**

1. In an improved process for the de-inking of printed waste paper which comprises (1) treating the waste paper in a pulper at an alkaline pH with alkali silicate, an oxidatively active bleaching agent, an acid selected from the group consisting of fatty acids and resinic acids containing more than 10 carbon atoms, and mixtures thereof, and a dispersing agent, and (2) separating the detached printing ink particles from the fiber suspension by either flotation, washing, or a combination thereof, the improvement comprising employing the acid and the dispersing agent together in the form of an oil-in-water emulsion.

4,586,983

PROCEDURE AND MEANS IN THE TREATMENT BY PRESSING OF A FIBRE WEB, IN PARTICULAR OF A PAPER OR CARDBOARD WEB

Jorma Laapotti, Jyväskylä, Finland, assignor to Valmet Oy, Finland

Continuation of Ser. No. 493,948, May 12, 1983, abandoned. This application Aug. 8, 1984, Ser. No. 638,683

Claims priority, application Finland, May 13, 1982, 821687

Int. Cl.[4] D21F *3/02*

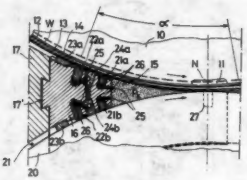
U.S. Cl. 162—205 **18 Claims**

1. In a pressing method for dewatering a fibre web in a paper press section including a single press nip defined by only two press rolls, said press nip and two press rolls defining a wedge-shaped throat region, and wherein the web to be dewatered is conducted through the press nip carried by fabric means, the improvement comprising the steps of

providing pressure shoe means defining a pre-pressing zone in a limited portion of said wedge-shaped throat region of the press nip wherein the web and the carrying fabric means are situated on a narrow sector of one of the rolls

and wherein a substantially impermeable band overlies the web and carrying fabric means;

applying a low substantially constant first fluid pre-pressure by said pressure shoe means onto the impermeable band on a side thereof opposite said carrying fabric means in the pre-pressing zone; and



conducting the web into the zone of the press nip immediately after the pre-pressing step and pressing the web with a second nip pressure having a peak pressure considerably higher than the first pre-pressure therein,

wherein the pressing of the web in the press nip zone substantially determines the dry matter content of the web after the press nip.

4,586,984

PRESS SECTION FOR A FIBROUS WEB

Jorma Laapotti, Palokka, Finland, assignor to Valmet Oy, Finland

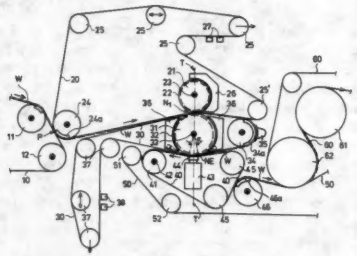
Filed Mar. 21, 1984, Ser. No. 591,786

Claims priority, application Finland, Mar. 25, 1983, 831028

The portion of the term of this patent subsequent to Nov. 5, 2002, has been disclaimed.

Int. Cl.[4] D21F *3/04*

U.S. Cl. 162—360.1 **19 Claims**



1. A press section for a paper web in a paper machine which also includes a forming section and a drying section, comprising:

a central hollow-faced non-suction roll;

a first double-felted press zone defined by said central roll and first press means situated in press zone-defining relationship with said central roll;

a second wide press zone defined by said central roll and second press means situated in press-defining relationship with said central roll;

said first and second press zones being located in substantially diametrically opposed relationship with respect to said central hollow-faced press roll and substantially in the region of a vertical plane passing through the axis of said central roll;

a first press fabric passing through said first and second press zones having a run from said first press zone to said second wide press zone;

a reversing suction roll substantially horizontally spaced from said central press roll and located between said first press zone and said second wide press zone, over a sector of which said run of said first press fabric reverses;

a second press fabric passing through said first press zone; and

means for conducting the web from the press section in a closed draw to the drying section; wherein

a wide press zone constituted by said first or second press zones is disposed at the bottom of said central press roll.

4,586,985

MULTI-EFFECT ROTARY DISTILLATION APPARATUS

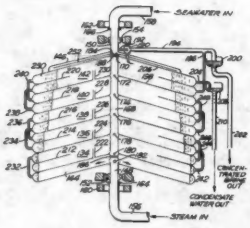
Joseph A. Ciocca, and Gregory W. Knowles, both of Huntington, N.Y., assignors to Grumman Allied Industries, Inc., Bethpage, N.Y.

Division of Ser. No. 320,100, Nov. 10, 1981, Pat. No. 4,451,334.

This application May 21, 1984, Ser. No. 583,583

Int. Cl.[4] B01D *1/26, 3/30*

U.S. Cl. 202—174 **10 Claims**



1. Multi-effect rotary distillation apparatus comprising a plurality of adjacent evaporation and condensation chambers, means for introducing liquid to be distilled into said chambers, and means for introducing heat energy into said chambers in a direction countercurrent to the direction of the liquid to be distilled, the walls of said evaporation and condensation chambers being formed of spaced, heat conductive sheets, each of said sheets forming a heat transfer means and common wall between adjoining chambers and providing a condensing surface on the side facing towards the means for introducing heat energy to said chambers and an evaporating surface on the side facing towards the means for introducing liquid to be distilled into said chambers, said heat conductive sheets transferring substantially all of the heat of condensation from each of said chambers to the next downstream chamber while maintaining a minimum temperature differential of about 3° F. between each of said chambers, means connected to said chambers for separately removing condensate and distilland therefrom, shaft means connected to said chambers for rotating the chambers about an axis which passes through the points of introduction to the chambers of the liquid to be distilled and the heat energy, and means coupled to said shaft means for driving said shaft means at a speed of rotation at least sufficient to generate a centrifugal force and disperse the distilland, collect the condensate, generate rings or columns of said liquid in said chambers and balance and maintain differential pressures between said chambers.

4,586,986
METHOD OF RECOVERING PURE AROMATIC SUBSTANCES

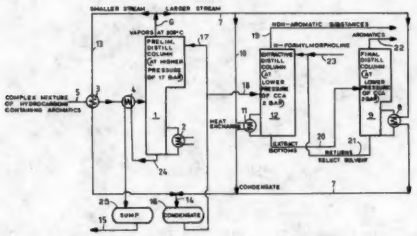
Gerhard Preusser, Essen; Martin Schulze, Neviges; Gerd Emmrich, Essen, and Hans-Christoph Schneider, Hattingen, all of Fed. Rep. of Germany, assignors to Krupp-Koppers GmbH, Essen, Fed. Rep. of Germany

Continuation of Ser. No. 412,860, Aug. 30, 1982, abandoned. This application Sep. 18, 1984, Ser. No. 652,161

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1981, 3135319

Int. Cl.[4] B01D *3/40*

U.S. Cl. 203—22 **9 Claims**



1. A method of recovering high-purity aromatic fractions from a complex mixture of hydrocarbons containing aromatic and non-aromatic constitutents, comprising the steps of feeding the mixture in a preliminary distillation stage and distilling the mixture at an operational pressure in a range up to 20 bar and an operational temperature in a range up to 300° C.; discharging vapors from the top of the preliminary distillation stage; using the heat content of at least a part of the discharged vapors for heating an extractive distillation stage and simultaneously condensing said vapors; extractively distilling the resulting condensate in the extractive distillation stage with N-substituted morpholine as selective solvent while adjusting the operational pressure in the preliminary distillation stage to a value at which the operational temperature of the preliminary distillation stage is higher than the temperature of the extractive distillation stage; then separately discharging from the extractive distillation stage the non-aromatic overhead constituents and extract bottoms which contain the aromatic constituents and the selective solvent; and then separating the aromatic constituents from the selective solvent.

4,586,987
OBTAINING C_1–C_4-ALKYL PENTENOATES BY DISTILLATION

Heinz-Walter Schneider, Ludwigshafen; Rudolf Kummer, Frankenthal; Otto Leman, Weisenheim, and Paul Panitz, Worms, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 10, 1985, Ser. No. 721,810

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1984, 3413448

Int. Cl.[4] B01D *3/34;* **C07C** *67/54*

U.S. Cl. 203—32 **4 Claims**

1. A process for obtaining a C_1–C_4-alkyl pentenoate, by distillation, from a reaction mixture which contains this and which is obtained by reacting butadiene, or a butadiene-containing hydrocarbon mixture, with carbon monoxide and a C_1–C_4-alkanol in the presence of a cobalt carbonyl catalyst and a tertiary nitrogen base at elevated temperatures and under superatmospheric pressure, wherein

(a) the liquid reaction mixture freed from excess carbon monoxide is treated with hydrogen at elevated temperatures and under from 5 to 80 bar,

(b) hydrocarbons are distilled off from the resulting liquid reaction mixture,

(c) the C_1–C_4-alkyl pentenoate, the alkanol and the tertiary nitrogen base are then distilled off under reduced pressure, and

(d) the C_1–C_4-alkyl pentenoate is obtained by fractional distillation from the distillate containing this compound, the alkanol and the tertiary nitrogen base.

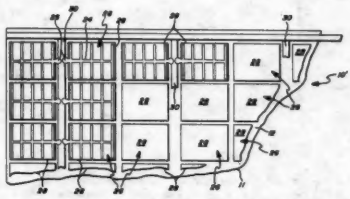
4,586,988
METHOD OF FORMING AN ELECTRICALLY CONDUCTIVE MEMBER

Prem Nath, Rochester, and Bela Fischer, Birmingham, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Aug. 19, 1983, Ser. No. 524,797

Int. Cl.[4] C25D *5/02*

U.S. Cl. 204—15 **22 Claims**



1. An improved method of applying an electrically conductive metallic material in a preselected pattern directly onto a substantially transparent, electrically conductive layer of an electronic device; the method including the steps of:

selecting said substantially transparent, electrically conductive layer from layers formed from materials consisting essentially of: tin oxide, indium oxide, zinc oxide and combinations thereof;

cleaning the substantially transparent, electrically conductive layer;

immersing the substantially transparent, electrically conductive layer in an electroplating bath;

providing a counter electrode in the electroplating bath;

providing a source of direct current;

establishing electrical communication between (a) a first terminal of the source of direct current and the substantially transparent, electrically conductive layer and (b) a second terminal of the source of direct current and the counter electrode;

activating the source of direct current, and electroplating the metallic material onto the substantially transparent, electrically conductive layer.

4,586,989
METHOD OF PLATING A CONDUCTIVE SUBSTRATE SURFACE WITH SILVER

Glen L. Rasmussen, Puyallup, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 7, 1985, Ser. No. 731,293

Int. Cl.[4] C25D *5/02, 5/34, 1/04*

U.S. Cl. 204—15 **23 Claims**

1. A method of plating a conductive substrate surface with silver comprising the steps of:

cleaning the substrate surface;

subjecting the clean substrate surface to anodic treatment in a bath of alkaline cyanide solution;

rinsing the anodically treated substrate in a second bath having about the same composition as the bath used for the anodic treatment step; and

electroplating the rinsed substrate surface with silver in a silver ion containing plating solution.

4,586,990

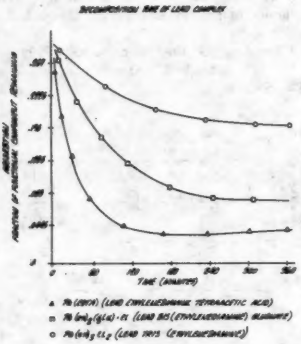
CHELATING METALS

Shepard Drazin, Los Angeles, and William P. Van Antwerp, Pacific Palisades, both of Calif., assignors to GSP Metals & Chemicals Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 357,907, Mar. 15, 1982, abandoned. This application Feb. 13, 1984, Ser. No. 579,481

Int. Cl.[4] C25D *3/56, 3/60;* C23C *30/00*

U.S. Cl. 204—44.4 12 Claims



1. A method for electroplating a metallic element with lead and tin simultaneously, the plating comprising at least 2% by weight lead and at least 90% by weight tin, the metallic element being part of a component that includes a leaded glass portion, the method comprising the steps of:

(a) forming an aqueous plating solution comprising water, sulfate ion, tin in an amount effective for electroplating, and chelated lead in an amount of at least about two parts by weight lead per 100 parts by weight tin, where the lead is chelated with a bifunctional chelating agent capable of forming with lead a five or six member group that is both stable and soluble in a sulfate solution, said chelating agent being selected from either ethylene diamine or ethylene diamine gluconate;

(b) placing a component comprising a metallic element and a leaded glass portion in the plating solution; and

(c) passing an electrical current through the solution to deposit lead and tin on the metallic element to form a plating comprising at least about 90% by weight tin and at least about 2% by weight lead.

4,586,991

HYDRONIUM (H_3O^+) POLYCRYSTALLINE SUPERIONIC CONDUCTORS AND METHOD (ION EXCHANGE) OF MAKING SAME

Patrick S. Nicholson, Ancaster, and Kimihiro Yamashita, Hamilton, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of Energy, Mines and Resources, Ottawa, Canada

Filed Sep. 25, 1984, Ser. No. 653,888

Claims priority, application Canada, May 2, 1984, 453309

Int. Cl.[4] C25B *1/14;* G01N *27/26*

U.S. Cl. 204—61 11 Claims

1. A process for producing an hydronium conducting solid polycrystalline ceramic comprising the steps of;

(a) selecting as a feed ceramic one of a group of precursor polycrystalline ceramics comprising $Na_5YSi_4O_{12}$ and $Na_5GdSi_4O_{12}$;

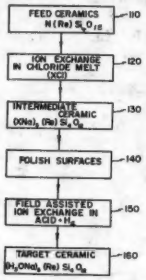
(b) immersing the said feed ceramic of said step (a) into a chloride melt for a period of between 10 to 20 hours whereby to exchange, some of the sodium ions thereof by cations of the melt whereby to create an intermediate ceramic of the general formula

$$(X^+Na^+)_5(Re)Si_4O_{12}$$

where X^+ is K^+, Cs^+, or K^+/Cs^+

(c) immersing the said intermediate ceramic of step (b) into an ion exchange acid; while,

(d) subjecting the intermediate ceramic to a potential difference across its surfaces while so immersed; and,



(e) maintaining the concentration of free hydrogen on one side of the ceramic for a period of at least 3 hours whereby to create a target ceramic of the general formula

$$(H_3O^+,Na^+)_5(Re)Si_4O_{12}$$

where Re=Y or Gd.

4,586,992

PROCESS FOR PRODUCING POTASSIUM HYDROXIDE

Haruhisa Miyake; Hiroaki Ito; Koji Suzuki, and Ryoji Yamada, all of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed May 14, 1985, Ser. No. 733,870

Claims priority, application Japan, May 29, 1984, 59-107618

Int. Cl.[4] C25B *1//10*

U.S. Cl. 204—98 4 Claims

1. A process for producing potassium hydroxide by electrolysis of potassium chloride in an electrolytic cell comprising an anode compartment and a cathode compartment partitioned by a cation exchange membrane, which process comprises:

supplying potassium chloride to the anode compartment for the electrolysis which forms potassium hydroxide in the cathode compartment, said cation exchange membrane being a multi-layer membrane comprising at least three layers including a main layer formed of a perfluorocarbon polymer having carboxylic acid groups as its ion exchange groups with an ion exchange capacity of from 0.9 to 1.6 meq/g dry resin and having a thickness of from 80 to 300 μm, a sulfonic acid film surface layer on the anode compartment side formed of a perfluorocarbon polymer having sulfonic acid groups as its ion exchange groups with an ion exchange capacity of from 0.5 to 1.5 meq/g dry resin and having a thickness of from 5 to 50 μm, and a composite film layer interposed therebetween which is formed of a perfluorocarbon polymer having both carboxylic acid and sulfonic acid groups and having a thickness of from 5 to 50 μm.

4,586,993

CONTROL OF SULFATES IN MEMBRANE CELL CHLOR-ALKALI PROCESS

Thomas F. O'Brien, Media, Pa., assignor to Stearns Catalytic World Corporation, Denver, Colo.

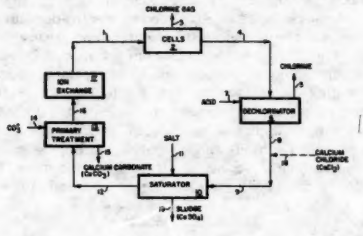
Filed May 31, 1985, Ser. No. 739,730

Int. Cl.[4] C25B *1/16*

U.S. Cl. 204—98 9 Claims

1. In a method of electrolyzing an alkali metal chloride brine

comprising an alkali metal salt solution with sulfate impurities in a membrane cell having at least an anolyte compartment containing an anode and a catholyte compartment containing a cathode, which method comprises feeding the brine solution to the anolyte compartment, imposing a voltage across the cell thereby evolving chlorine at the anode and evolving an alkali metal hydroxide at the cathode after migration of the alkali metal ion through the membrane into the catholyte compartment, removing the alkali metal salt-depleted brine solution from the anolyte compartment, separating the chlorine evolved at the anode from the alkali metal salt-depleted brine



BRINE LOOP IN CHLOR-ALKALI PLANT

solution, resaturating the brine solution by contact with impure alkali metal chloride, treating the resaturated brine solution to remove impurities, and recycling the treated resaturated brine solution as feed to the anolyte compartment, the improvement which comprises adding a controlled amount of a source of calcium ion to the alkali metal salt-depleted brine solution, after the solution exits the anolyte compartment and prior to resaturation, followed by precipitation of calcium carbonate ($CaCO_3$) from the brine solution by introducing an alkali metal carbonate after resaturation of the alkali metal salt-depleted brine solution, whereby the concentration of sulfate entering the membrane cell is controlled.

4,586,994

ELECTROLYTIC PROCESS OF AN AQUEOUS ALKALI METAL HALIDE SOLUTION AND ELECTROLYTIC CELL USED THEREFOR

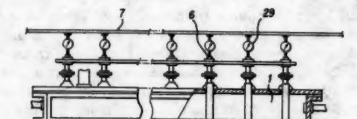
Yasushi Samejima, Kakogawa; Minoru Shiga, Himeji; Toshiji Kano, Kakogawa; Kiyoshi Yamada, Kobe, all of Japan, and Tsutomu Nishio, deceased, late of Kakogawa, Japan (by Haruko Nishio, legal representative), assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 6, 1983, Ser. No. 558,661

Claims priority, application Japan, Dec. 6, 1982, 57-213729; Feb. 17, 1983, 58-25350; Mar. 31, 1983, 58-57099; Apr. 13, 1983, 58-66198

Int. Cl.[4] C25B *1/16*

U.S. Cl. 204—98 **13 Claims**



1. In a process for electrolyzing an aqueous alkali metal halide solution using a horizontal type electrolytic cell partitioned by a cation exchange membrane positioned substantially horizontal in the cell and dividing the cell into an upper anode compartment and lower cathode compartment, the improvement which comprises using a cell with a cathode compartment having a gas-liquid impermeable cathode plate and carrying out the electrolysis while maintaining an initial linear velocity of catholyte liquor in the cathode compartment at not less than 8 cm/sec and a gas content in the electrode compartment adjacent to a catholyte liquor outlet at not more than 0.6, wherein the gas content in the cathode compartment is a ratio of cathode gas to a mixture of cathode gas and catholyte liquor which is represented by R in the following equation:

$$R=G/(L+G)$$

wherein G is an amount of cathode gas generated (m^3/Hr) and L is the flow rate (m^3/Hr) of the catholyte liquor.

4,586,995

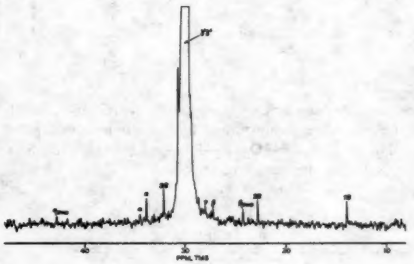
POLYMER AND IRRADIATION TREATMENT METHOD

James C. Randall, Bartlesville, Okla., and Frederick J. Zoepfl, Annandale, Va., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 17, 1982, Ser. No. 419,248

Int. Cl.[4] C08F *2/46*

U.S. Cl. 522—5 **45 Claims**



1. A method comprising:

irradiating a polymer selected from ethylene homopolymers and copolymers in the absence of oxygen under non-gelling conditions at a temperature above the crystalline melting temperature of the polymer and greater than about 130° C., and

cooling the resulting irradiated, non-gelled polymer to a temperature below its crystalline melting point.

4,586,996

SURFACE HARDNER FOR NYLON LENS

Kazuhiro Shinohara; Shunzo Abe, and Hideo Miyake, all of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Japan

Filed Aug. 21, 1984, Ser. No. 642,863

Claims priority, application Japan, Aug. 29, 1983, 58-158485

Int. Cl.[4] C08F *2/50, 30/08; G02C 7/04*

U.S. Cl. 522—7 **3 Claims**

1. A surface hardner for nylon lens, comprising (a) a polyfunctional acrylic ester monomer, (b) a photoinitiator, (c) a diluent, and (d) a silane compound, said photoinitiator consisting of a combination of a hydrogen abstraction type photoinitator audan α-clevage type photoinitator and being incorporated in an amount of 0.1 to 15 parts by weight to 100 parts by weight of the polyfunctional acrylic ester monomer, and said silane compound containing at least one polymerizable unsaturated bond is additionally incorporated in an amount of 0.1 to 10% by weight based on the weight of the polyfunctional acrylic ester monomer.

4,586,997

SOLUBLE SILICONE-IMIDE COPOLYMERS

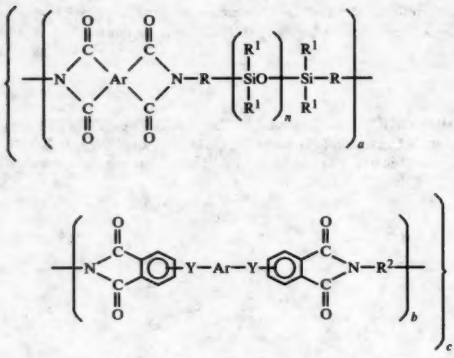
Chung J. Lee, Ballston Lake, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Oct. 19, 1984, Ser. No. 662,930

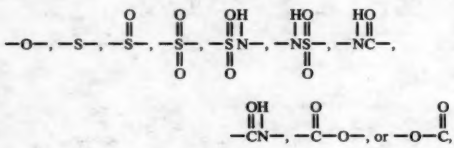
Int. Cl.[4] C08F 2/46; B05D 3/02; C08G 77/04

U.S. Cl. 525—426 11 Claims

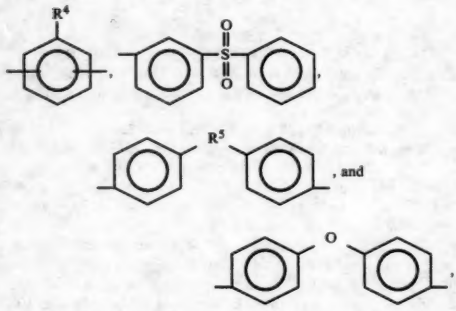
1. A diglyme soluble siloxane-imide copolymer composition having the general formula



where each Ar is an independently selected aromatic radical; R is a substituted or unsubstituted hydrocarbylene radical or a radical of the formula —Q—Z—R^3—, where Q is a substituted or unsubstituted aromatic group, Z is



and R^3 is a substituted or unsubstituted hydrocarbylene; each R^1 is an independently selected substituted or unsubstituted hydrocarbyl radical; R^2 is a radical selected from the group consisting of



where R^4 is an alkyl radical having from 1 to 9 carbon atoms and R^5 is an alkyl radical having from 1 to 4 carbon atoms; Y is oxygen or sulfur, and a, b, c and n are all integers equal to or greater than 1.

4,586,998

ELECTROLYTIC CELL WITH LOW HYDROGEN OVERVOLTAGE CATHODE

Nicholas S. Wood, Cheshire, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Aug. 20, 1984, Ser. No. 642,166

Claims priority, application United Kingdom, Aug. 31, 1983, 8323390

Int. Cl.[4] C25B 9/00, 11/08; C25D 3/52

U.S. Cl. 204—252 10 Claims

1. An electrolytic cell comprising an anode or a plurality of anodes, a cathode or a plurality of cathodes, and a separator positioned between each adjacent anode and cathode, in which the cathode or cathodes are produced by electro-depositing on a nickel or nickel alloy substrate a coating comprising at least an outer layer of at least one platinum group metal, wherein the said outer layer of the platinum group metal is deposited from a plating bath which contains a solution of at least one platinum group metal compound and at least one additive of the type which suppresses maxima in polarographic waves associated with reactions carried out at a dropping mercury electrode, said additive being further selected from those which do not react with the platinum group metal in the plating bath.

4,586,999

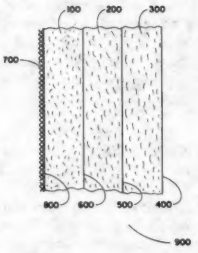
THREE LAYER CARBON BASED ELECTRODE

Charles E. Goldsmith, Baton Rouge, La., and Thomas A. Patterson, Dalton, Ga., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 29, 1984, Ser. No. 665,891

Int. Cl.[4] C25B 9/00, 11/03, 11/12

U.S. Cl. 204—265 15 Claims



13. An electrochemical cell suitable for electrochemically reacting a gas with a liquid, said cell comprising at least two electrodes, wherein at least one of the electrodes is a laminated electrode having:

(a) an electrically conductive first layer having a plurality of interconnecting passageways of an average diameter of from about 0.1 to about 1.0 microns,

said first layer containing from about 2 to about 10 weight percent of a catalyst active for the reduction of oxygen, and having a hydrophobic carbon containing from about 80 to about 95 weight percent carbon and from about 5 to about 20 weight percent of a first hydrophobic material,

(b) an electrically conductive second layer in fluid flow communication with the first layer and having a plurality of interconnecting passageways of an average diameter of from about 0.2 to about 10 microns,

said second layer physically contacting the first layer and containing from about 2 to about 10 weight percent of a catalyst active for the oxygen reduction, and having a hydrophobic carbon containing from about 60 to about 85 weight percent carbon and from about 15 to about 40 weight percent of a second hydrophobic material provided said second layer is more hydrophobic than said first layer;

(c) a substantially completely electrically nonconductive, catalytically inactive third layer in physical contact and in fluid flow communication with said second layer, said third layer being substantially completely composed of a third hydrophobic material and having a plurality of interconnecting passageways of an average diameter of from about 2 to about 10 microns; and

(d) an electrically conductive current collector in physical and electrical contact with said first layer.

4,587,000

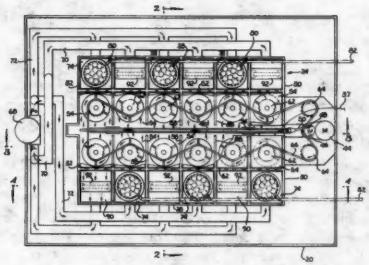
ELECTROPLATING METHOD AND APPARATUS FOR ELECTROPLATING HIGH ASPECT RATIO THRU-HOLES

Peter P. Pellegrino, 216 Edgewood La., Apple Valley, Minn. 55124, and Damian Pellegrino, 17029 Harbor Bluff Cir., Huntington Beach, Calif. 92649

Filed Nov. 19, 1984, Ser. No. 672,601

Int. Cl.[4] C25D *17/00*

U.S. Cl. 204—273 **14 Claims**



1. Plating apparatus for the plating of through holes in a printed circuit board comprising

a container for confining a plating solution;

printed circuit board support means for supporting a printed circuit board within said container, said support means including reciprocating means for repetitive movement of said circuit board back and forth in a plane substantially coincident with the plane of the circuit board;

divider means adjacent each side of said printed circuit board support means for alternatively defining first and second cells along each side of said printed circuit board support means;

agitator means within each of said cells for mechanically providing substantial agitation to a plating solution therein; and

pump means for delivering plating solution to said first cells and for removing plating solution from said second cells, each of said second cells being substantially opposite one of said first cells, whereby first plating solution will be encouraged to flow from said first cells through the through holes in a printed circuit board on said printed circuit board support means and into said second cells to provide fresh plating solution to the inner surfaces of through holes.

4,587,001

CATHODE FOR USE IN ELECTROLYTIC CELL

John F. Cairns; David A. Denton, both of Cheshire, England, and Patrick A. Izzard, North Wales, Wales, assignors to Imperial Chemical Industries PLC, London, England

Filed Jun. 11, 1984, Ser. No. 619,208

Claims priority, application United Kingdom, Jun. 21, 1983, 8316778

Int. Cl.[4] C25B *11/08*

U.S. Cl. 204—290 R **7 Claims**

1. A cathode for use in an electrolytic cell which comprises a metallic substrate and a coating thereon having at least an outer layer of a mixture of at least one platinum group metal and at least one platinum group metal oxide, characterised in that the platinum group metal in the mixture thereof with the platinum group metal oxide comprises from 2% to 30% by weight of the mixture.

4,587,002

APPARATUS FOR FLOATING TRANSPORT AND PROCESSING OF SUBSTRATE OR TAPE

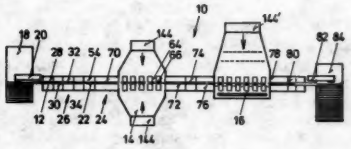
Edward Bok, Burg. Amersfoordtlaan 82, 1171 DR Badhoevedorp, Netherlands

Division of Ser. No. 598,549, filed as PCT NL83/00031, on Aug. 23, 1983, published as WO84/01084 on Mar. 15, 1983, § 102(e) date Mar. 19, 1984. This application May 21, 1985, Ser. No. 736,587

Claims priority, application Netherlands, Aug. 24, 1982, 8203318

Int. Cl.[4] C23C *15/00*

U.S. Cl. 204—298 **46 Claims**



1. Apparatus for floating transport and processing of substrates comprising:

(a) an elongated cabin defining a longitudinal passage for moving substrates;

(b) at least one processing module surrounding and in communication with said longitudinal passage;

(c) a supply of pressurized gaseous transport and processing medium for said substrates communicating with the top and bottom of said longitudinal passage via successive pluralities of transversely arrayed gaseous medium supply ports interconnecting said longitudinal passage; and

(d) a plurality of gaseous medium discharge ports intersecting the top and bottom of said passage in front of and behind each said gaseous medium supply passage, such that primary flow and secondary flow of gaseous medium is achieved in said passage.

4,587,003

GAS SENSOR

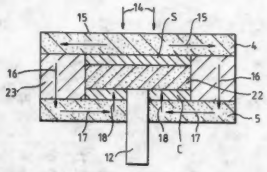
Anthony D. S. Tantram, Great Bookham, and Yat S. Chan, London, both of England, assignors to City Technology Limited, London, England

Filed May 18, 1984, Ser. No. 611,876

Claims priority, application United Kingdom, May 19, 1983, 8313846

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—412 **15 Claims**



1. An electro-chemical gas sensor capable of sensing a gas of

primary interest in the presence of an interfering gas, said sensor comprising a housing, an electrolyte contained within said housing, first and second hydrophobic gas diffusion electrodes permeable to gas contacting said electrolyte, means for measuring the current passing between said first and second electrodes, each of said first and second electrodes comprising a powdered catalyst, a hydrophobic plastic material bonding said catalyst and a porous hydrophobic plastic support means, first means defining a first gas path, said first gas path providing gas access to said first electrode, and second means within said housing defining second and third porous insulating paths between said first and second electrodes, said second path means being hydrophilic and providing an electrolyte path between said first and second electrodes, said third path being hydrophobic and impermeable to electrolyte but permeable to gas and providing a path for diffusion of gas from said first electrode to said second electrode such that said third path provides access from said first electrode to said second electrode for interfering gas that has not fully reacted at said first electrode.

4,587,004

PROCESS FOR BENEFICIATING OIL-SHALE

Michael Siskin, Livingston, and Glen Brons, Phillipsburg, both of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 600,431, Apr. 16, 1984, Pat. No. 4,491,513. This application Dec. 27, 1984, Ser. No. 686,608

The portion of the term of this patent subsequent to Jan. 1, 2002, has been disclaimed.

Int. Cl.[4] C10G *1/04*

U.S. Cl. 208—429 **23 Claims**

1. A process for beneficiating oil-shale which method comprises contacting the oil-shale in two stages wherein the stages are characterized as follows:

stage 1 is conducted at pH in the range of about 5 to 9 in the presence of an aqueous ammonium salt solution;

stage 2 being conducted at a pH in the range of about 0.5 to 5 or about 9 to 12 in the presence of an organic solvent at a temperature in the range of about 0° C. to about 300° C. for an effective amount of time.

4,587,005

PROCESS FOR BENEFICIATING RUNDLE OIL-SHALE

Michael Siskin, Livingston, and Glen Brons, Phillipsburg, both of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 600,431, Apr. 16, 1984, Pat. No. 4,491,513. This application Dec. 27, 1984, Ser. No. 686,728

The portion of the term of this patent subsequent to Jan. 1, 2002, has been disclaimed.

Int. Cl.[4] C10G *1/04*

U.S. Cl. 208—415 **12 Claims**

1. A process for removing mineral matter from Rundle oil-shale which process comprises contacting the Rundle oil-shale with (a) an ammonium salt solution and (b) a shale-oil, at a temperature from about 0° C. to about 300° C. for a time which is sufficient to substantially separate at least about 80 wt. % of the carbonate mineral matter from the oil-shale.

4,587,006

PROCESS FOR RECOVERING SHALE OIL FROM RAW OIL SHALE

Carl S. Minden, Salt Lake City, Utah, assignor to Breckinridge Minerals, Inc., Murray, Utah

Filed Jul. 15, 1985, Ser. No. 754,937

Int. Cl.[4] C10G *1/02, 1/04*

U.S. Cl. 208—410 **13 Claims**

1. A continuous process for treating raw oil shale to produce shale oil of improved quality and yield which comprises the following steps:

a. crushing and grinding the raw oil shale,

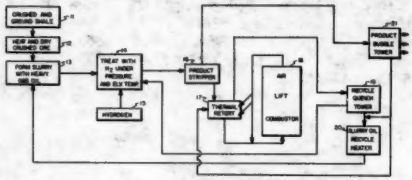
b. heating and drying the crushed and ground shale,

c. passing the heated and dried shale particles to a slurry mixer where it is mixed with hot heavy oil recycle,

d. passing the slurry into a pressurized hydropyrolysis chamber where it is treated with hydrogen under a pressure of 500 to 2000 psi and a temperature of 400 degrees C. to about 500 degrees C. for a short residence time,

e. discharging the hydropyrolysis reaction mixture into a product stripper wherein the product hydrocarbons and a portion of the recycle slurry oil is vaporized and passed to a separation column for recovery of the desired hydrocarbon products,

f. feeding the remaining spent shale and slurry oil to a thermal retort chamber where under fluidized bed conditions



it is subjected to a temperature gradient by introducing spent shale that has been burned in an air lift combustor at at least two different treatment zones, the upper zone being selected such that the temperature is sufficient to vaporize the remaining slurry oil, and the lower zone being selected such that the temperature is sufficient to thermally retort residual organic carbon and hydrogen remaining after hydropyrolysis and to thermally crack the excess heavy oil charged to this section of the reactor,

g. taking the combined gas and liquid product to a quench tower where the liquid product is recycled to the hydropyrolysis reactor and the heavy gas oil is recycled to the slurry mixer,

h. and discharging the spent shale at the bottom of the thermal retort chamber to the air lift combustor.

4,587,007

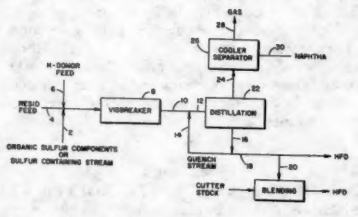
PROCESS FOR VISBREAKING RESIDS IN THE PRESENCE OF HYDROGEN-DONOR MATERIALS AND ORGANIC SULFUR COMPOUNDS

Leslie R. Rudnick, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 648,413, Sep. 10, 1984, abandoned. This application Aug. 12, 1985, Ser. No. 764,522

Int. Cl.[4] C10G *9/00*

U.S. Cl. 208—107 **28 Claims**



1. A method for visbreaking a heavy petroleum residual oil comprising:

(a) adding to said residual oil an organic sulfur compound having an active thiol component; and

(b) visbreaking said oil in the presence of a highly aromatic hydrogen donor material characterized by its hydrogen content distribution wherein H_A, and H_α are each at least

about 20 percent of the total hydrogen-donor hydrogen content, and thereafter recovering a fuel oil product having reduced viscosity.

4,587,008

PROCESS COMPRISING REFORMING, SYNTHESIS, AND HYDROCRACKING

Johannes K. Minderhoud; Martin F. M. Post; Swan T. Sie, and Ernst J. R. Sudhölter, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 30, 1984, Ser. No. 666,527

Claims priority, application Netherlands, Nov. 15, 1983, 8303910

Int. Cl.[4] C07C *27/06;* C10G *47/04*

U.S. Cl. 208—109 16 Claims

1. A process for the preparation of C_9+ hydrocarbons from C_4- hydrocarbons present in a feed stream and C_8- hydrocarbons present in a recycle stream which comprises: (1) passing C_4- hydrocarbons as a feed stream and C_8- hydrocarbons as a recycle steam to a steam reforming zone to steam reform said hydrocarbons into a mixture of carbon monoxide and hydrogen at a temperature of from about 700° C. to 1000° C. and a pressure of from about 2 to about 25 bars in the presence of a steam reforming catalyst comprising an iron-group metal catalyst and, (2) passing at least a portion of said mixture of carbon monoxide and hydrogen from said steam reforming zone to a synthesis zone at an elevated temperature of about 125° to 350° C. and a pressure of from about 5–100 bar in contact with a catalyst comprising 3–60 pbw cobalt and 0.1 to 100 pbw of at least a second metal selected from the group consisting of zirconium, titanium and chromium all per 100 pbw of a support selected from the group consisting of silica, alumina and combinations of silica and alumina, which catalyst has been prepared by kneading or kneading and impregnating in accordance with:

$$(3+4R)>L/S>(0.3+0.4R),$$

wherein

L=the total quantity of cobalt present on the catalyst, expressed as mg Co/ml catalyst;

S=the surface area of the catalyst, expressed as m^2/ml catalyst; and

R=the weight ratio of the quantity of cobalt deposited on said support by kneading to the total quantity of cobalt present on the catalyst;

to form a product of a mixture of C_9+ hydrocarbons, unconverted hydrogen, carbon monoxide, steam and a mixture of C_8- hydrocarbons, all of which is withdrawn and separated into (1) a liquid product stream comprising said C_9+ hydrocarbons and (2) a gaseous stream comprising said unconverted hydrogen, carbon monoxide, steam and C_8- hydrocarbons and recycling at least a portion of said gaseous stream as said recycle stream said carbon monoxide, stream, C_8- hydrocarbons and at least a portion of said unconverted hydrogen in the gaseous phase as said recycle stream.

4,587,009

HYDROCARBON HYDROGENATION WITH THERMALLY STABLE MIXED TITANIUM OXIDE GELS

Kenneth S. Wheelock, Baton Rouge, La., assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 662,596, Oct. 19, 1984, abandoned, which is a continuation-in-part of Ser. No. 452,839, Dec. 23, 1982, Pat. No. 4,499,195. This application Jul. 2, 1985, Ser. No. 751,026

Int. Cl.[4] C10G *45/38, 45/40, 45/68, 45/70*

U.S. Cl. 208—111 8 Claims

1. A process for the hydrogenation of a hydrocarbon feed which comprises contacting said feed, in the presence of hydrogen, at temperatures ranging from about 250° F. to about 1100° F., pressures ranging from about 0 psig to about 2000 psig, and space velocities ranging from about 0.1 V/H/V to about 10 V/H/V, with a catalyst comprising a high surface area co-gel of a smectite and an oxide selected from titanium oxide, zirconium oxide, hafnium oxide, thorium oxide, uranium oxide, silicon oxide, and aluminum oxide, upon which there is supported from about 0.05 percent to about 30 percent, based on the weight of the catalyst, of a metal selected from the group consisting of a Group VIB and Group VIII metal hydrogenation-dehydrogenation component.

4,587,010

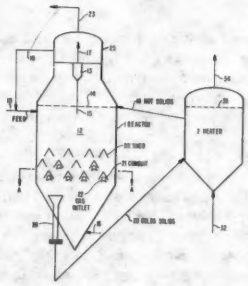
FLUID COKING WITH IMPROVED STRIPPING

Don E. Blaser, Randolph; Bong H. Chang, Summit, and Charles L. Baker, Morris Plains, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 596,098, Apr. 2, 1984, abandoned. This application Jun. 12, 1985, Ser. No. 743,917

Int. Cl.[4] C10G *9/32*

U.S. Cl. 208—127 10 Claims



1. In a fluid coking process which comprises the steps of:

(a) reacting a carbonaceous chargestock having a Conradson carbon residue of at least 5 weight percent in a coking zone containing a bed of fluidized solids comprising at least about 75 weight percent particles greater than 100 microns in diameter, said solids being maintained under fluid coking conditions to form coke which deposits on said fluidized solids and a vapor phase product, including normally liquid hydrocarbons;

(b) stripping said solids with the coke deposit and adherent hydrocarbons in the lower portion of said coking zone, by contacting said solids with a fluidizing and stripping gas to remove at least a portion of said adherent hydrocarbons from said solids, said lower stripping portion having positioned therein flow deflecting means spaced along the horizontal plane of said stripping portion;

(c) removing a stream of the resulting stripped solids from said coking zone through a solids outlet means positioned in said coking zone;

(d) passing the stream of removed solids to a heating zone to heat said solids; and

(e) recycling a portion of said heated solids from said heating zone to said coking zone,

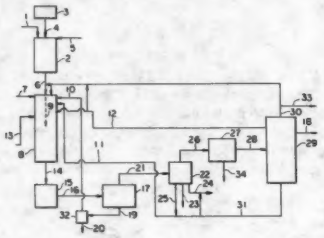
the improvement which comprises introducing at least a portion of said fluidizing and stripping gas into said stripping portion as a plurality of streams along said horizontal plane in the proximity of said flow deflecting means such that the superficial gas velocity of said fluidizing gas through said stripping portion ranges from about 0.3 to about 1.0 foot per second.

4,587,011

THERMAL CRACKING PROCESS FOR SELECTIVELY PRODUCING PETROCHEMICAL PRODUCTS FROM HYDROCARBONS

Toshiro Okamoto, Tokyo, and Michio Ohshima, Hiroshima, both of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Jun. 28, 1984, Ser. No. 625,714
Claims priority, application Japan, Jun. 30, 1983, 58-119307
Int. Cl.[4] C10G 9/38
U.S. Cl. 208—129 4 Claims



1. A thermal cracking process for selectively producing petrochemical products from hydrocarbons which comprises the steps of (a) burning hydrocarbons with oxygen in the presence of steam to produce a hot gas of from 1300° to 3000° C. comprising steam; (b) feeding hydrogen to the hot gas; (c) further feeding starting hydrocarbons, containing hydrocarbons of higher and lower boiling points, to the hot gas comprising the steam and hydrogen such that the starting hydrocarbons are fed to a plurality of different temperature zones of a reactor by a plurality of feed streams so that the feed streams of higher boiling points are fed to a section of the reactor having higher temperature zones, and the feed streams of low boiling range are fed to a corresponding lower temperature zone of the reactor; and thermally cracking the respective hydrocarbons under different conditions while keeping the cracking temperature at 650° to 1500° C., the total residence time at 5 to 1000 milliseconds, the pressure at 2 to 100 bars, and the partial pressure of hydrogen, after thermal cracking of a hydrocarbon comprising hydrocarbon components whose boiling point exceeds 200° C., at at least 0.1 bar; and quenching the resulting reaction product.

4,587,012

PROCESS FOR UPGRADING HYDROCARBONACEOUS FEEDSTOCKS

Richard J. Quana, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 31, 1983, Ser. No. 547,704
Int. Cl.[4] C10G 45/06
U.S. Cl. 208—251 H 16 Claims

1. A process for upgrading a hydrocarbonaceous feedstock comprising contacting the feedstock in the presence of hydrogen under upgrading conditions with a catalyst comprising alumina, at least 35% of which is in the alpha phase, said catalyst having at least about 25% of its pore volume in pores from 300–1,000 Å in diameter, having no more than about 10% of its pore volume in pores greater than 1,000 Å in diameter and having a surface area of less than about 100 m^2/g.

4,587,013

MONOTHIOPHOSPHINATES AS ACID, NEUTRAL, OR MILDLY ALKALINE CIRCUIT SULFIDE COLLECTORS AND PROCESS FOR USING SAME

D. R. Nagaraj, Stamford, and Samuel S. Wang, Cheshire, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

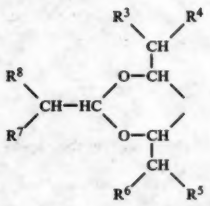
Filed Nov. 28, 1984, Ser. No. 675,489
Int. Cl.[4] B03D 1/02
U.S. Cl. 209—167 11 Claims

1. A process for the beneficiation of base metal sulfide minerals from base metal sulfide ores with selective rejection of gangue sulfide minerals at a pH value of less than 10.0, said process comprising:

(a) providing an aqueous pulp slurry of finely divided, liberation-sized ore particles having a pH of less than 10.0;

(b) conditioning said pulp slurry with effective amounts of a frothing agent and a metal collector, respectively, said metal collector comprising at least one diorganomonothiophosphinate compound, selected from compounds of the formula:

wherein R^1 and R^2 are each, independently, selected from alkyl radicals, or wherein R^1 and R^2 together form a heterocyclic ring having the formula:



wherein R^3, R^4, R^5, R^6, R^7 and R^8 are each, independently, selected from hydrogen and C_1 to C_{12} alkyl; and X is selected from hydrogen, alkali or alkaline earth metals and NH_4; and

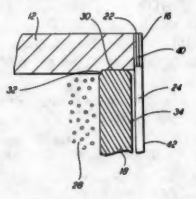
(c) thereafter, collecting the base metal sulfide minerals by froth flotation.

4,587,014

LIQUID CHROMATOGRAPHY COLUMN ASSEMBLY

William G. America, Danbury, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed May 7, 1984, Ser. No. 607,878
Int. Cl.[4] B01D 15/08
U.S. Cl. 210—198.2 1 Claim



1. A liquid chromatography column assembly comprising, in combination:

a liquid chromatography separation column;
a housing having said column positioned therein;
retaining means affixed to said housing for retaining a column injection fitting; said retaining means including a portion extending beyond said housing, said portion having an internally threaded opening, said column extending beyond said portion of said fitting retaining means;
a semi-rigid gasket disposed between the end of said column and a column injection fitting, said gasket having an inside diameter at least equal to the inside diameter of said column;
a porous frit disposed adjacent the end of said column through which frit liquid must pass prior to entry into said column; and
said housing, said frit, said semi-rigid gasket and said retaining means being shaped so that in use a sealed substantially cylindrical cavity is formed between the fitting to which said retaining means couples and said frit thereby permitting substantially uniform injection of liquid into said column through said frit.

4,587,015

PLATE FILTER PRESS

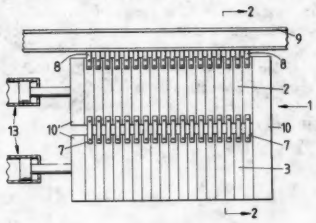
Oswald Busse, Aarbergen, Fed. Rep. of Germany, assignor to Passavant-Werke AG & Co. KG, Fed. Rep. of Germany

Filed Jun. 12, 1984, Ser. No. 619,796

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1983, 3321340

Int. Cl.⁴ B01D *25/12*

U.S. Cl. 210—224 **5 Claims**



1. In a plate filter press having a plurality of vertically oriented filter plates with each filter plate being supported for movement along horizontal guide means parallel to the filter press length, the improvement comprising:
(a) an additional filter plate arranged beneath each filter plate which is supported for movement along said guide means so that each additional filter plate depends beneath an upper filter plate in substantially the same vertical plane therewith and said guide means is provided exclusively for said upper filter plate, and
(b) connecting elements connecting each additional filter plate to its upper filter plate for substantially concomitant motion therewith.

4,587,016

CERAMIC FILTER TUBES

Ikuo Sumiyoshi, Kashiwa, Japan, assignor to Shiki Roll Kabushiki Kaisha, Tokyo, Japan

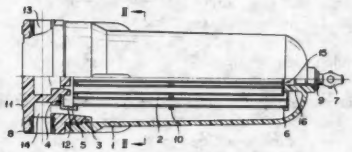
Filed Jun. 14, 1984, Ser. No. 620,422

Claims priority, application Japan, Oct. 17, 1983, 58-159338[U]

Int. Cl.⁴ B01D *25/02*

U.S. Cl. 210—323.2 **9 Claims**

1. A filter comprising in combination: a cartridge-type filter element having a plurality of filter units each of which consists of a cylindrical porous ceramic tube having a controlled pore diameter, a fixed wall thickness, and is open at both ends, and a case therefore in which said cylindrical porous ceramic tubes are water-tightly closed at one-end part thereof with an end plate and watertightly supported in place at the other end part thereof with a bundling ring which has a filtrate discharge duct in communication with the interior of said tubes to form a filtrate discharge path; in which said case encircles said filter element; in which a cover has outlet means providing a filtrate discharge path communicating with the interior of said tubes through said discharge duct and said bundling ring; in which said cover also has inlet means which provides a feed liquid



injection path which communicates with the empty space intervening between said case and said filter element and with the exterior surface of all of said tubes; and in which said cover tightly seals said case, whereby the feed liquid is constrained to flow through said porous ceramic tubes in its traverse from said inlet means to said discharge means, and wherein said tubes are disposed side by side in parallel relation with the ends thereof at one end being watertightly closed by said end plate and the ends thereof at the opposite end opening into and water-tightly sealed in said bundling ring.

4,587,017

FILTER INCORPORATING MULTIPLE CHAMBERS FOR RECEIVING THE FILTERED FLUID AND ANOTHER FLUID ISSUING FROM THE RESIDUE OF THE MAIN FILTRATION

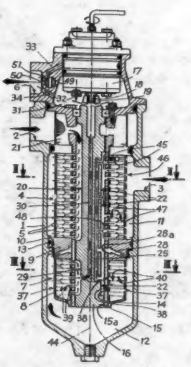
Théophile Christophe, Fontenay le Fleury, and Jean-Claude Moatti, Boulogne, both of France, assignors to Georges Moatti, France

Filed Nov. 7, 1984, Ser. No. 669,308

Claims priority, application France, Nov. 17, 1983, 83 18327

Int. Cl.⁴ B01D *25/02, 25/32*

U.S. Cl. 210—323.1 **7 Claims**



1. In a filter constituted by:
a filter body comprising a plurality of distinct chambers isolated from one another,
a main stack of filtering elements contained in one of said chambers, called main chamber, each of the filtering elements of the main stack having a recessed centre and a cylindrical side, comprising a plurality of sections isolated

from one another and being provided on its outer and inner radial circumferences with orifices for communication of each of its sections with said circumferences,

a shut-off distribution valve which is adjusted to said cylindrical side, which is mounted to rotate about the axis of the cylindrical side, and which comprises a main enclosure capable in a first position of the distribution valve, of isolating a first section of any one filtering element of the main stack from the other sections of said filtering element and of communicating with said first section via the orifice for communication of said first section,

a discharge chamber connected to said main enclosure by at least one inlet duct through said distribution valve and connected to a fluid evacuation union through a calibrated outlet restriction, and

wherein said discharge chamber is connectable to an unpressurized enclosure through a complementary duct by means of a two-position valve such that, in a first position of said valve, said complementary duct is closed against flow, and in a second position of said valve, said complementary duct ensures free communication between said discharge chamber and said unpressurized enclosure.

4,587,018

FIBRIN GEL

Birger Blomback, and Masahisa Okada, both of New York, N.Y., assignors to New York Blood Center, Inc., New York, N.Y.

Division of Ser. No. 617,663, Jun. 5, 1984, Pat. No. 4,505,817, which is a division of Ser. No. 395,768, Jul. 6, 1982. This application Nov. 16, 1984, Ser. No. 672,060

Claims priority, application Sweden, Dec. 30, 1981, 8107864

Int. Cl.[4] C12N *11/04*; B01D *39/00*; C12M *1/40*

U.S. Cl. 210—484 **13 Claims**

1. A fibrin gel containing therein at least one catalytically active substance selected from the group consisting of a catalytically active enzyme or a catalytically active metal, said fibrin gel having substantially uniform pore sizes and containing means for retaining the shape of at least the upper surface of the gel against deformation when contacted by a flowing medium.

4,587,019

AEROBIC DIGESTION OF SLUDGE

Waldemar K. Wolinski, Hitchen, England, assignor to Water Research Centre, Marlow, England

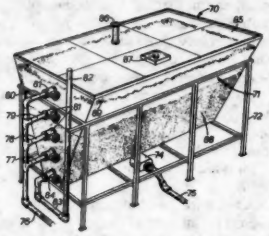
Filed Jan. 11, 1985, Ser. No. 690,538

Claims priority, application United Kingdom, Jan. 17, 1984, 8401130

Int. Cl.[4] C02F *11/02*

U.S. Cl. 210—608 **8 Claims**

1. In a process for the aerobic digestion of a biodegradable sludge, wherein the sludge is aerated with air in a digester vessel and sludge foam is formed and builds up over the surface of the sludge, the improvement which comprises continuously maintaining a layer of said foam over the surface of the sludge in an amount at least sufficient to ensure that at least 50% of the oxygen in the air is absorbed during the digestion, and wherein none of the foam formed is removed from the vessel but the build-up is controlled by passing sludge directly into or on to



the foam in the vessel to cause the local collapse of any excess foam.

4,587,020

CHROMATOGRAPHIC PLATE

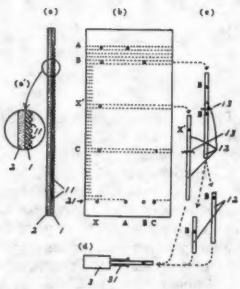
Yuzo Nakagawa, Osaka; Kouji Iwatani, Hyogo, and Tetsuro Kadono, Osaka, all of Japan, assignors to Shionogi & Company, Ltd., Osaka, Japan

Filed Aug. 16, 1984, Ser. No. 641,552

Claims priority, application Japan, Aug. 17, 1983, 58-150605

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—658 **12 Claims**



10. A method for conducting chromatographical analysis of a sample or plurality of samples comprising:

placing a sample or plurality of samples onto the bottom of a chromatographic plate, said plate having a support layer of sheet glass, a sintered chromatographically-active adsorbent layer on the front of the support, said adsorbent layer containing a chromatographically-active adsorbent material, a glass powder binding agent and a fluorescent material powder; and a plurality of linear grooves engraved on the rear of the plate;

subjecting said sample or said plurality of samples to ascending chromatographic development in a solvent system, thereby separating said sample or said plurality of samples into component substances; and

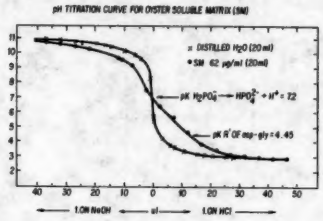
isolating said component substances by cloving said plate along said grooves.

4,587,021

INHIBITION OF THE FORMATION OF INORGANIC OR BIOLOGICAL $CACO_3$-CONTAINING DEPOSITS BY A PROTEINACEOUS FRACTION OBTAINED FROM $CACO_3$-FORMING ORGANISMS

Alfred P. Wheeler, Clemson, S.C., and C. Steven Sikes, Mobile, Ala., assignors to University of South Alabama, Mobile, Ala.

Filed Dec. 19, 1983, Ser. No. 563,280
Int. Cl.[4] C02F 5/12
U.S. Cl. 210—698 **21 Claims**


pH TITRATION CURVE FOR OYSTER SOLUBLE MATRIX (SM)
x DISTILLED H_2O (20 ml)
• SM 62 μg/ml (20ml)
pK $H_2PO_4^- \rightarrow HPO_4^{2-} + H^+$ = 7.2
pK R' OF asp-gly = 4.45
1.0N NaOH
1.0N HCl

1. A method of inhibiting the formation of $CaCO_3$-containing deposits on a surface, comprising applying to said surface a composition comprising between at least 10^{-4} and 1000 μg/ml of a peptide-containing fraction isolated from a $CaCO_3$-containing tissue obtained from a $CaCO_3$-forming organism; wherein the molecular weight of the peptide-containing fraction is 150,000 or lower, and wherein the peptide-containing fraction is obtained by a method comprising the step of placing the $CaCO_3$-containing tissue in contact with an aqueous solution selected from the group consisting of 0.001–30 g/100 ml of a calcium chelating agent, 0.001–20 g/100 ml or ml/100 of a weak organic acid and an inorganic acid wherein the pH of said solution is maintained at about 1–5 during the isolation of said fraction, for an appropriate length of time.

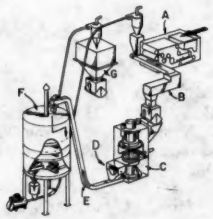
15. The method of claim 14 wherein the protein-containing fraction has a MW of about 10^6–10^7.

4,587,022

PROCESS FOR DEWATERING SLUDGE

Hideaki Shimizu; Eiichi Kofune; Haruhisa Saitoh, and Katsuya Kobayashi, all of Kumagaya, Japan, assignors to Hitachi Metals, Ltd., Japan

Continuation-in-part of Ser. No. 485,043, Apr. 14, 1983, abandoned. This application Sep. 24, 1985, Ser. No. 779,465
Claims priority, application Japan, Apr. 15, 1982, 57-61750
Int. Cl.[4] C02F 11/14
U.S. Cl. 210—710 **15 Claims**



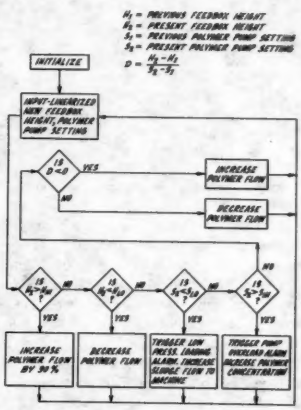
1. A process for dewatering sludge, comprising the steps of:
dewatering said sludge to a water content of less than about 85% by weight;
disintegrating said dewatered sludge in a disintegrating apparatus to form sludge pieces having an outer dimension of about 20 mm or less, the speed and operating time of said disintegrating apparatus being limited to prevent said disintegrated sludge from becoming like a slurry and to prevent the destruction of the naturally occurring inner structure of said sludge;
conditioning said dewatered sludge by adding a dry dewatering additive thereto to form porous coatings of said additive on the surfaces of said sludge pieces while preventing a significant amount of said additive from being mixed into said sludge pieces, the amount of said additive being by weight at least about 10% of the dry weight of said sludge; and
compressing said conditioned sludge pieces to force water within said sludge pieces to permeate out of said sludge pieces through clearances in said naturally occurring inner structure and to flow from said sludge pieces through passages in said porous coatings of said additive until the water content of said compressed sludge pieces is below 60% by weight.

4,587,023

CONTROL SYSTEM FOR A PROCESS

Sanjay R. Srivatsa, Naperville; Robert L. Wetegrove, Winfield, and Robert R. Patzelt, Oak Lawn, all of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Aug. 31, 1984, Ser. No. 646,251
Int. Cl.[4] B01D 33/04
U.S. Cl. 210—744 **10 Claims**


H_1 = PREVIOUS FEEDBOX HEIGHT
H_2 = PRESENT FEEDBOX HEIGHT
S_1 = PREVIOUS POLYMER PUMP SETTING
S_2 = PRESENT POLYMER PUMP SETTING
$D = \frac{H_2 - H_1}{S_2 - S_1}$
INITIALIZE
INPUT LINEARIZED MIN FEEDBOX HEIGHT, POLYMER PUMP SETTING
D < 0
YES
NO
INCREASE POLYMER FLOW
DECREASE POLYMER FLOW
IS $H_2 \geq H_{MIN}$?
IS $H_2 - H_1 \geq 0$?
IS $S_2 \geq S_{MIN}$?
IS $S_2 \geq S_{MAX}$?
INCREASE POLYMER FLOW BY 30%
DECREASE POLYMER FLOW
TRIGGER LOW PRESS. ALARM, INCREASE SLUDGE FLOW TO MACHINE
TRIGGER PUMP OVERLOAD ALARM, DECREASE POLYMER CONCENTRATION

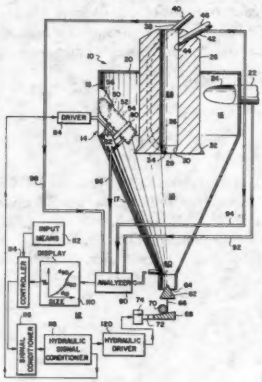
8. In a twin belt filter press of the type used for sludge dewatering, including a conditioning tank in which treatment chemicals are mixed with the feed sludge and a feedbox mounted above a belt in the gravity drainage zone, a method of controlling the flow rate of treatment chemicals, comprising the steps of:
(a) taking first measurements of the chemical flow rate and the height of the sludge in the feedbox,
(b) taking second measurements of the chemical flow rate and the height of the sludge in the feedbox, the second measurements following the first measurements by a time period,
(c) calculating the ratio of the change in feedbox height to the change in chemical flow rates,
(d) increasing the chemical flow rate if said ratio is negative or decreasing the chemical flow rate if said ratio is positive or zero, and
(e) successively repeating steps (b)–(d) while treating the previously second measurement as a first measurement.

4,587,024

METHOD AND APPARATUS FOR SEPARATING PARTICLES FLUIDLY SUSPENDED IN A SLURRY

Asadollah Hayatdavoudi, Lafayette, La., assignor to Premiere Casing Services, Inc., Lafayette, La.

Filed Aug. 21, 1984, Ser. No. 642,803
Int. Cl.[4] B04C *5/08*
U.S. Cl. 210—739 38 Claims



1. A cyclone separator comprising:

a body member;

a cylindrical region defined within a first portion of said body, one axial end of said cylindrical region being enclosed by a sealing member as part of said body;

a substantially frustoconical region defined within a second portion of said body, the base portion of said frustoconical region adjoining the other axial end of said cylindrical region;

an inlet port in communication with said cylindrical region and extending through said first portion of said body;

an upper outlet and a lower outlet, both being concentric to the longitudinal axis of said cylindrical and said frustoconical regions, said upper outlet in communication with said cylindrical region and extending through said sealing member at said one axial end of said cylindrical region, said lower outlet located at the truncated apex of said frustoconical region, being in communication with said frustoconical region and extending through said second portion of said body;

a side outlet in communication with said cylindrical region and extending through said first portion of said body, said side outlet being substantially aligned with the tangential streamlines of flow extending from the streamlines of flow within said cylindrical region when fluid like slurry is introduced into said cylindrical region via said inlet port; and

a moveable means for receiving different strata of said fluid like slurry passing through the radially outer sectors of said cylindrical region, said moveable means for receiving being disposed in said side outlet and being moveable such that the strata received therein is selectable in accordance with the position of said moveable means for receiving.

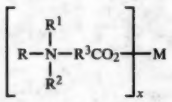
4,587,025

ZWITTERIONIC QUATERNARY AMMONIUM CARBOXYLATES, THEIR METAL SALTS AND LUBRICANTS CONTAINING SAME

Andrew G. Horodysky, Cherry Hill, and Joan M. Kaminski, Mullica Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 393,898, Jun. 30, 1982, Pat. No. 4,473,377.
This application Oct. 11, 1983, Ser. No. 540,722
Int. Cl.[4] C10M *1/54*
U.S. Cl. 252—34 14 Claims

1. A compound of the formula



wherein R is a hydrocarbyl group containing 8 to 20 carbon atoms, R^1 and R^2 are hydrogen or alkyl groups containing 1 to 10 carbon atoms, R^3 is an alkyl group having 2 to 10 carbon atoms or a benzyl group, x is the valence of M and M is a metal selected from Groups IA, IIA, IIB, VIB and VIII of the Periodic Table.

4,587,026

MULTIFUNCTIONAL LUBRICANT ADDITIVES

Andrew G. Horodysky, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 21, 1984, Ser. No. 622,820
Int. Cl.[4] C10M *149/00, 151/00, 153/00*
U.S. Cl. 252—47.5 24 Claims

1. A lubricant composition comprising a major proportion of an oil of lubricating viscosity or a grease prepared therefrom and a minor effective proportion of a multifunctional additive having friction reducing, antioxidation and corrosion inhibition characteristics consisting of an amine or alkoxylated amine sulfurized phenol borate or mixtures thereof wherein said amine is selected from the group consisting of a hydrocarbyl monoamine or diamine, a hydrocarbyloxy hydrocarbylene monoamine or diamine, a hydrocarbyl alkoxylated monoamine or diamine, a hydrocarbyloxy hydrocarbylene alkoxylated monoamine or diamine and wherein hydrocarbyl comprises a member selected from the group consisting of alkyl, alkylene, cycloalkyl, aryl and alkaryl or mixtures thereof.

4,587,027

ANTIFREEZE FOR POTABLE WATER

Robert W. Preusch; Thomas F. O'Farrell, and Ollie O'Neal, Jr., all of Chicago, Ill., assignors to United States Movidyn Corporation, Chicago, Ill.

Filed Sep. 16, 1984, Ser. No. 648,009
Int. Cl.[4] C09K *5/00*
U.S. Cl. 252—73 2 Claims

1. A liquid solution, for use in potable water systems, which substantially withstands freezing and damaging expansion to temperatures of 50° Fahrenheit below zero (minus 45° C.), comprising 14.12% by liquid volume of an inhibitor solution comprising about 70.941% food-grade corn syrup, 29.047% water, 0.007% food-grade coloring dye, and 0.005% preservative; 19.00% plus or minus 0.25% food-grade propylene glycol; and the balance water.

4,587,028

NON-SILICATE ANTIFREEZE FORMULATIONS

Jerome W. Darden, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Oct. 15, 1984, Ser. No. 660,623
Int. Cl.[4] C09K 5/00
U.S. Cl. 252—76 9 Claims

1. A non-silicate, non-gelling corrosion inhibited antifreeze composition comprising a water-soluble liquid alcohol freezing point depressant comprising ethylene glycol and an inhibitor combination comprising.

a. about 2 to 5 percent of an alkali metal salt of benzoic acid,

b. about 0.5 to 1.5 percent of an alkali metal salt of a dicarboxylic acid having eight to twelve carbon atoms, and

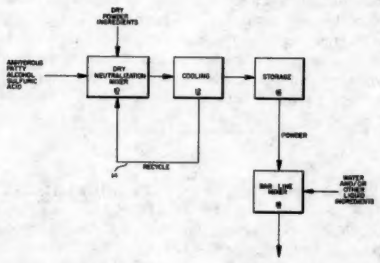
c. about 0.1 to 0.5 percent of an alkali metal nitrate in the absence of silicates.

4,587,029

INTERMEDIATE PRODUCT FOR USE IN PRODUCING A DETERGENT BAR

Burton Brooks, Bellevue, Wash., assignor to The Chemithon Corporation, Seattle, Wash.

Division of Ser. No. 508,131, Jun. 27, 1983, Pat. No. 4,515,707. This application Nov. 16, 1984, Ser. No. 672,080
Int. Cl.[4] C11D 17/06, 1/12
U.S. Cl. 252—91 10 Claims



1. A storable, intermediate product for use in the production of a laundry detergent bar, said product comprising:

from 0 to 10 wt. % water;

the remainder being primarily (a) the sodium salt of a sulfuric acid selected from the group consisting of C_{8-20} fatty alcohol sulfuric acids and ethoxylated C_{8-20} fatty alcohol sulfuric acids and (b) sodium bicarbonate;

each of said sodium salt and said sodium bicarbonate having a wt. % greater than the wt. % of said water;

said product having a dry, powdered form;

said product being substantially devoid of free water and of said sulfuric acid;

the total number of mols of sodium bicarbonate and water being at least equal to the number of mols of said sodium salt.

4,587,030

FOAMABLE, ACIDIC CLEANING COMPOSITIONS

Sheryl K. Casey, Eagan, Minn., assignor to Economics Laboratory, Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 510,946, Jul. 5, 1983, abandoned. This application Jun. 13, 1984, Ser. No. 618,923
Int. Cl.[4] C11D 17/00, 7/08
U.S. Cl. 252—92 18 Claims

1. A foam-producing system which comprises a container, having a foam generating means, which contains an acidic cleaning composition comprising:

a major proportion of water;

a sufficient amount of an acidic component comprising a mixture of a weak inorganic acid and a weak organic acid to provide a pH of about 1 to 5 in a 1% solution in water of the cleaning composition;

an effective amount of a cationic surfactant having the formula:

$$(R_1)(R_2)(R_3)N \rightarrow O$$

wherein R_1 is a C_8–C_{20}-alkyl or C_8–C_{20}-alkylamido-C_2–C_5-alkyl and R_2 and R_3 are individually C_1–C_4-lower alkyl or hydroxy-C_1–C_4-lower alkyl; and,

an effective amount of a cosolvent which can reduce surface tension and maintain the cleaning components in a stable mixture;

wherein the foam generator produces a layer of cohesive foam having a depth of about 1 to about 30 millimeters in the substantial absence of airborn spray or mist of the cleaning composition.

4,587,031

PROCESS FOR THE PRODUCTION OF TABLET FORM DETERGENT COMPOSITIONS

Hans Kruse, Korschenbroich; Martin Witthaus; Theodor Altenschöpfer, both of Duesseldorf, and Klaus Schumann, Erkrath, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 10, 1984, Ser. No. 598,626
Claims priority, application Fed. Rep. of Germany, May 2, 1983, 3315950
Int. Cl.[4] C11D 17/00
U.S. Cl. 252—135 19 Claims

1. In a process for manufacturing detergent compositions in tablet form by mixing the ingredients and then tableting the mixture, the improvement comprising the sequential steps of:

hydrating partially from about 10 to 60 parts by weight of an anhydrous sodium tripolyphosphate with a sufficient quantity of water to form from about 30 mole percent to less than about 80 mole percent of tripolyphosphate hexahydrate;

mixing said partial hydrate after a residence time of from about 5 to 60 seconds with from about 20 to 70 parts by weight of a powder form, substantially anhydrous, sodium silicate consisting essentially of Na_2O and SiO_2 in a ratio of from 1:1–4, followed by spraying with water or with an aqueous sodium silicate solution; and

granulating the product by agitation, followed by crystallization;

adding tableting aids and any remaining ingredients desired to the granulate and further mixing; said tableting aids consisting essentially of sodium acetate in a quantity of about 1 to 5% by weight, dicalcium phosphate dihydrate in a quantity of 0.5 to 3% by weight, or a mixture thereof, all based upon the weight of the entire composition to be tableted; and

tableting the composition under pressures of more than 70 Kg/cm^2.

4,587,032

DRAIN CLEANER

Thomas A. Rogers, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 6, 1984, Ser. No. 668,917
Int. Cl.[4] C11D 17/00
U.S. Cl. 252—174.17 11 Claims

1. A drain cleaner composition which comprises

(i) about 5 to about 20% by weight of an organic solvent selected from the group consisting of lactones, pyrrolidinones, derivatives thereof and mixtures thereof,

(ii) about 1 to about 10% by weight of a thioorganic compound for decomposing protein fiber,

(iii) about 1 to about 5% by weight of a surfactant,

(iv) about 10 to about 25% by weight of a water soluble thickener, and

(vi) about 50 to about 80% by weight of water.

4,587,033

POLYMERIC ACETAL CARBOXYLATE COMPOSITIONS

David R. Dyroff, Ladue, and Yueting Chou, Chesterfield, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jul. 2, 1984, Ser. No. 627,262
Int. Cl.[4] C11D 7/16; C08G 2/30
U.S. Cl. 524—405 30 Claims

1. A composition in solid form consisting essentially of a polymeric acetal carboxylate in intimate admixture with a stabilizing amount of a basic additive, said additive having sufficient basicity and buffering power to maintain the pH of the composition above about 9.5.

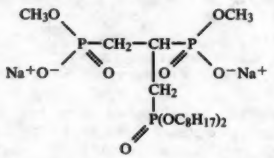
4,587,034

TRIPHOSPHONIC ESTERS

Georges Sturtz, Brest; Thierry Pensec, Bannalec, and Jean-Claude Gautier, Billere, all of France, assignors to Societe Nationale Elf Aquitaine (Production), France

Division of Ser. No. 166,291, Jul. 7, 1980, Pat. No. 4,464,346.
This application Oct. 11, 1983, Ser. No. 540,841
Claims priority, application France, Jul. 9, 1979, 79 17737
The portion of the term of this patent subsequent to Aug. 7, 2001, has been disclaimed.
Int. Cl.[4] C09K 3/00
U.S. Cl. 252—184 4 Claims

1. A composition for the extraction of a metal compound from an aqueous solution comprising an organic liquid containing 1 to 30% by weight of a triphosphonic ester of the formula:



4,587,035

PROCESS FOR ENHANCING TI:AL_2O_3 TUNABLE LASER CRYSTAL FLUORESCENCE BY ANNEALING

Milan R. Kokta, Washougal, Wash., assignor to Union Carbide Corporation, Danbury, Conn.

Filed May 20, 1985, Ser. No. 736,244
Int. Cl.[4] C09K 11/36
U.S. Cl. 252—301.4 F 1 Claim

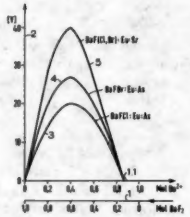
1. A process for minimizing the absorption of Ti:Al_2O_3 crystal material in the range of 750 to 950 nm which comprises (i) heating the crystal material in a vacuum of at least 1×10^{-6} torr at a temperature in the range of about 1850° to 2000° C. for at least 48 hours (ii) cooling the material from its temperature in said range to 1500° C. at a rate not exceeding 2° C. per minute, the cooled material exhibiting a higher lasing efficiency than the Ti:Al_2O_3 crystal material prior to said heating and cooling.

4,587,036

X-RAY IMAGE STORAGE SCREEN

Heinz Degenhardt, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Nov. 21, 1984, Ser. No. 673,736
Claims priority, application Fed. Rep. of Germany, Dec. 27, 1983, 3347207
Int. Cl.[4] C09K 11/08
U.S. Cl. 252—301.4 H 6 Claims



1. An x-ray image storage screen having a storage layer consisting of an alkaline earth-mixed halogen of the formula BaF(Cl,Br):Eu:Sr as the active substance wherein each mole contains barium fluoride in the range of approximately 0.4 through 0.8 mol and the remainder of said 1 mol consists of approximately equal portions of barium chloride and barium bromide, and wherein europium and strontium are employed as activators in an amount of up to 10^{-4} g-atom europium and up to 10^{-2} g-atom strontium.

4,587,037

PYRROLE POLYMERS AS ELECTRICAL HEATING ELEMENTS

Helmut Münstedt, Wachenheim; Helmut Gebhard, Boehl-Iggelheim; Herbert Naarmann, Wattenheim, and Johannes Schlag, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed May 4, 1984, Ser. No. 607,158
Claims priority, application Fed. Rep. of Germany, May 4, 1983, 3316182
The portion of the term of this patent subsequent to Aug. 28, 2001, has been disclaimed.
Int. Cl.[4] H01B 1/06
U.S. Cl. 252—500 10 Claims

1. A heating element which comprises:
a molding of a pyrrole polymer which has been complexed with anions, said molding being shaped to the desired dimensions of the heating element; and
means connected to the molding to pass an electrical current through said molding in a heat generating manner.

4,587,038

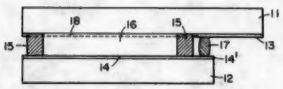
ELECTRO-OPTIC DISPLAY DEVICE AND A METHOD OF PRODUCING THE SAME

Katsuhide Tamura, Soka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 9, 1981, Ser. No. 271,993
Claims priority, application Japan, Jun. 26, 1980, 55-87080; Feb. 6, 1981, 56-16409
Int. Cl.[4] H01B 1/06
U.S. Cl. 252—511 13 Claims

1. An electro-optic display device in which a conductive paste is disposed between opposed electrodes, characterized in that said conductive paste comprises (1) an organic silicone monomer having a reactive silicon radical and a reactive or-

ganic radical, (2) a conductive powder, and (3) an organic resin adhesive; said organic silicone monomer being in an amount



sufficient to form at least a monomolecular layer of organic silicone monomer on said electrodes.

4,587,039

ELECTRICALLY-CONDUCTIVE RESIN COMPOSITION

Noboru Yamaoka; Seiju Kezuka, both of Yokohama; Moriya Iida, Yamato; Mituji Miyoshi, Fujisawa, and Kazuo Matsuura, Ota, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan

Filed Aug. 6, 1984, Ser. No. 637,730

Claims priority, application Japan, Aug. 19, 1983, 58-150350

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 **1 Claim**

1. An electrically-conductive resin composition consisting essentially of an ethylene/α-olefin copolymer, wherein said α-olefin is propylene, butene-1,4-methylpentene-1 or hexene-1, and 10 to 60 weight percent based on the total weight of the composition of carbon black, said ethylene/α-olefin copolymer having the following properties (i)–(iv) and being prepared by copolymerizing ethylene with said α-olefin in the presence of a catalyst comprising a solid catalyst component and an organoaluminum compound, said solid catalyst component containing at least magnesium and titanium:

(i) Melt index: 0.01–100 g/10 min

(ii) Density: 0.870–0.910 g/cm^3

(iii) Maximum peak temperature (Tm) according to Differential Scanning Calorimetry (DSC): not lower than 100° C.

(iv) Percent insoluble in boiling n-hexane: not less than 10 wt. %.

4,587,040

THICK FILM THERMISTOR COMPOSITION

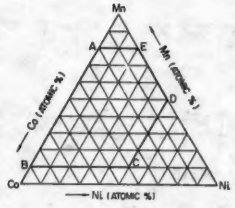
Hiromi Tosaki; Teruo Mozume; Hideo Arima, and Akira Ikegami, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 28, 1979, Ser. No. 16,166

Claims priority, application Japan, Mar. 1, 1978, 53-22075

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—519 **7 Claims**



1. A thick film thermistor composition, which comprises (a) a powdery thermistor of compound oxides of spinel structure consisting essentially of a fired powdery mixture of metal oxide powders of at least two of Mn, Co and Ni, and an oxide powder of Ru as a noble metal, (b) an oxide powder of Ru for adjusting a resistance, and (c) a glass powder, wherein (i) a mixing proportion of the metal oxide powders of at least two of Mn, Co and Ni is in an area surrounded by lines A-B-C-D-E in a triangular diagram of FIG. 1, and an amount of the oxide powder of Ru as the noble metal is 0.5 to 50% by atom on the basis of total of metal components in the metal oxide powders of at least two of Mn, Co and Ni, and the oxide powder of Ru, and (ii) amounts of the oxide powder of Ru for adjusting a resistance and an amount of the glass powder are 1 to 12% by weight and 20 to 60% by weight, respectively, on the basis of total of the powdery thermistor of the compound oxides of spinel structure comprising the fired powdery mixture of the metal oxides of at least two of Mn, Co and Ni, and the oxide powder of Ru as the noble metal, the glass powder and the oxide powder of Ru for adjusting a resistance, the balance being the powdery thermistor, and points A, B, C, D, and E of FIG. 1 have the following compositions:

	Mn (% by atom)	Ni (% by atom)	Co (% by atom)
A	80	0	20
B	10	0	90
C	10	50	40
D	50	50	0
E	80	20	0

4,587,041

METHOD FOR MANUFACTURING DIELECTRIC METAL TITANATE

Satoru Uedaira; Hiroshi Yamanoi, and Hidemasa Tamura, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 28, 1984, Ser. No. 675,448

Claims priority, application Japan, Nov. 29, 1983, 58-224844; Dec. 5, 1983, 58-229721; Jul. 19, 1984, 59-150430

Int. Cl.[4] H01B *3/20*; C01G *23/00*

U.S. Cl. 252—572 **4 Claims**

1. Method for manufacturing dielectric metal titanate $MTiO_3$ where M represents Ba and/or Sr comprising the steps of:

preparing an aqueous alkaline solution having a pH not lower than 12.2 and containing at least one salt of a metal selected from the group consisting of barium and strontium, said solution containing at least 0.1 mol/l of divalent barium or strontium ions, respectively; and

immersing metal titanium into said solution at a temperature not less than 20° C. to form said metal titanate $MTiO_3$ where M is at least one of the metals barium and strontium.

4,587,042

IMMERSION OIL SYSTEM

Michael Liva, 16 High St., Wayne, N.J. 07470

Filed Feb. 27, 1984, Ser. No. 583,676

Int. Cl.[4] G02B *5/20*; G01N *21/15*

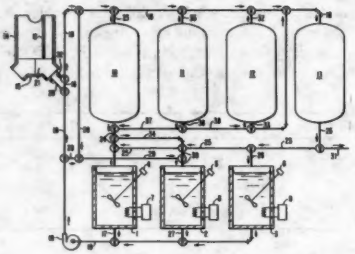
U.S. Cl. 252—582 **17 Claims**

1. An immersion oil for use in microscopy consisting essentially of a mixture of a minor fraction by volume of a low molecular weight hydrocarbon resin made from alpha methyl styrene or derivatives thereof, diphenyl isodecyl phosphite in the range of about 30% to about 45% by volume of the immersion oil, and the remainder of said immersion oil being; at least one of mineral oil, polybutylene fluid or trilauryl trithio phosphite.

4,587,043
DECONTAMINATION OF METAL SURFACES IN NUCLEAR POWER REACTORS

Alexander P. Murray, Murrysville; Sharon L. Weisberg, Pittsburgh, and Lawrence F. Becker, Jr., N. Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 7, 1983, Ser. No. 501,980
Int. Cl.[4] G21F 9/00; C23G 1/02
U.S. Cl. 252—626 **17 Claims**



1. A method of decontaminating metal surfaces coated with oxides containing radioactive substances comprising:

(A) providing a decontamination solution which comprises

(1) water;

(2) about 0.02 to about 0.5% of at least one water-soluble organic acid which has an equilibrium constant in a complex with ferric ion of at least 10^9, and which is capable of producing a pH of 2 to 3 in water; and

(3) about 0.01 to about 0.4% of a chelate in free acid form which has an equilibrium constant in a complex with ferric ion of about 10^{15} to about 10^{19}, and which is soluble at at least 0.4% at 40° C. in water having a pH of about 2 to about 3;

(B) heating said decontamination solution to about 70° to about 200° C.;

(C) circulating said decontamination solution over said metal surfaces and through a cation exchange resin until the radioactivity of said decontamination solution does not increase significantly after contacting said metal surfaces;

(D) providing an oxidizing solution which comprises

(1) water;

(2) 0.2 to 2.5% of an alkali metal permanganate; and

(3) about 0.2 to about 2.5% of an alkali metal hydroxide;

(E) heating said oxidizing solution to about 70° to about 200° C.;

(F) circulating said oxidizing solution over said metal surfaces until the dichromate level in said oxidizing solution ceases to increase significantly; and

(G) circulating said decontamination solution over said metal surfaces and through a cation exchange resin until the radioactivity of said decontamination solution does not increase significantly after contacting said metal surfaces.

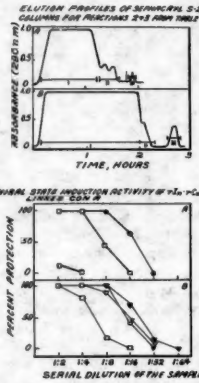
4,587,044
LINKAGE OF PROTEINS TO NUCLEIC ACIDS

Paul S. Miller, Baltimore, and Paul O. P. Ts'O, Lutherville, both of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Sep. 1, 1983, Ser. No. 528,573
Int. Cl.[4] C07K 17/00; C07H 17/00, 15/12
U.S. Cl. 530—211 **47 Claims**

1. A method for producing a nucleic acid-protein conjugate which interacts with a living cell wherein the protein is specifically selected for the purpose of guiding the nucleic acid into said living cell, said method comprising

(a) modifying said nucleic acid by esterifying the said nucleic acid with a saturated or unsaturated aliphatic dicarboxylic acid or an anhydride thereof and reacting the terminal free carboxyl group of the resulting ester with a diaminoalkane of the formula $H_2N—(CH_2)_n—NH_2$ wherein n is an integer from 2 to 12, so as to produce a modified nucleic acid containing a terminal amino group reactive with a bifunctional crosslinking agent and



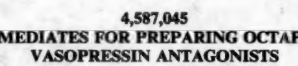
(b) reacting said bifunctional crosslinking agent with said modified nucleic acid and said protein.

4,587,045
INTERMEDIATES FOR PREPARING OCTAPEPTIDE VASOPRESSIN ANTAGONISTS

William F. Huffman, Malvern, and Michael L. Moore, Media, both of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Division of Ser. No. 624,542, Jun. 26, 1984, Pat. No. 4,542,124, which is a continuation-in-part of Ser. No. 467,117, Feb. 16, 1983, Pat. No. 4,469,679. This application May 16, 1985, Ser. No. 734,522
Int. Cl.[4] C07K 7/06
U.S. Cl. 530—328 **5 Claims**

1. A polypeptide compound of the formula:



in which:

X is D-Phe, D-Val, D-Leu, D-Ile, D-Nva, D-Pba, D-Nle, D-Cha, D-Abu, D-Met, D-Chg, D-Tyr, L-Tyr, D-alle, D-Tyr(alk) or L-Tyr(alk);

P is Phe or Phe(4'Alk);

Y is NH_2, NHAlk, NHBzl or OH;

A is Val, Ile, Abu, Ala, Gly, Lys, Cha, Nle, Phe, Leu, Chg or Nva;

W is L-Pro, ΔPro, D-Pro or, when Y is OH, a single bond;

Z is D-Arg, L-Arg, D-Lys, L-Lys or, when Y is OH, a single bond;

Q^1 and Q^2 are both a displaceable group; and

Cap is a β,β-cycloalkylene propionic acid with S-Q^1 attached at the β-position and having 5–7 units in the cycloalkylene chain, or ester derivatives thereof.

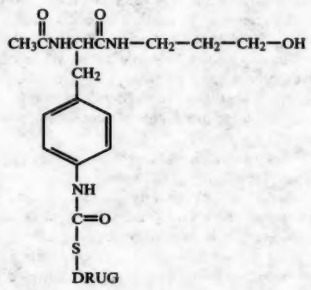
4,587,046

DRUG-CARRIER CONJUGATES

Murray Goodman, La Jolla; Neal Castagnoli, San Rafael; Kenneth Jacobson, Laguna Beach; Kenneth L. Melmon, Woodside; Roberto P. Rosenkranz, Menlo Park, and Michael S. Verlander, Del Mar, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed May 18, 1982, Ser. No. 379,463
Int. Cl.[4] C07C *103/52, 101/72*
U.S. Cl. 530—330 16 Claims

1. A drug conjugate having the formula:



wherein

S is a spacer grouping comprising a branched alkyl chain having from 2 to 6 carbon atoms in the non-branched portion of the alkyl chain and wherein the branched portion is a lower alkyl group having from 1–4 carbon atoms and wherein one end of the spacer grouping is covalently bound to the drug and the other end is covalently bound to

and wherein the branch of the spacer grouping is adjacent the drug; and

DRUG is selected from the group of sympathomimetic and autacoid drug moieties.

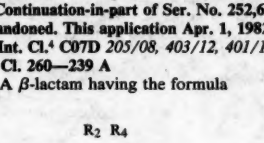
4,587,047

2-OXO-1-[[(SUBSTITUTED SULFONYL)AMINO]-CARBONYL]AZETIDINES

Hermann Breuer, Schoenhofen, Fed. Rep. of Germany; William A. Slusarchyk, Belle Mead, N.J.; Theodor Denzel, and Uwe D. Treuner, both of Regensburg, Fed. Rep. of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 252,672, Apr. 9, 1981, abandoned. This application Apr. 1, 1982, Ser. No. 364,352
Int. Cl.[4] C07D *205/08, 403/12, 401/12;* A61K *31/395*
U.S. Cl. 260—239 A 42 Claims

1. A β-lactam having the formula



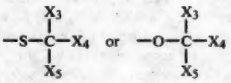
or a pharmaceutically acceptable salt thereof; wherein

R is alkyl, alkenyl, alkynyl, substituted alkyl, phenyl, substituted phenyl, a 5, 6 or 7-membered heterocycle, phenylalkyl, (substituted phenyl)alkyl, (5, 6 or 7-membered heterocycle)alkyl, or —NR_aR_b wherein R_a AND R_b are the same or different and each is hydrogen, alkyl, substituted alkyl, phenyl, substituted phenyl, phenylalkyl, or (substituted phenyl)alkyl or one of R_a and R_b is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl and the other is amino, alkanoylamino, arylcarbonylamino, alkoxycarbonylamino, alkysulfonylamino, alkylamino, dialkylamino, phenylamino, (substituted phenyl)amino, hydroxy, cyano, alkoxy, phenyloxy, (substituted phenyl)oxy, phenylalkoxy, (substituted phenyl)-alkoxy, a 5, 6 or 7-membered heterocycle, (5, 6 or 7-membered heterocycle)alkyl, (5, 6 or 7-membered heterocycle)alkoxy, alkylsulfonyl, alkylmethyleneamino, phenylmethyleneamino or (substituted phenyl)methyleneamino;

R_1 is an acyl group derived from a carboxylic acid;

R_2 is hydrogen or methoxy;

R_3 and R_4 are the same or different and each is hydrogen, alkyl, cycloalkyl, phenyl or substituted phenyl, or one of R_3 and R_4 is hydrogen and the other is alkoxycarbonyl, alken-1-yl, alkyn-1-yl, 2-phenylethenyl, 2-phenylethynyl, carboxyl, —CH_2X_1 (wherein X_1 is azido, amino, hydroxy, alkanoylamino, alkylsulfonyloxy, phenylsulfonyloxy, (substituted phenyl)sulfonyloxy, phenyl, substituted phenyl, halogen, benzylthio, (substituted phenyl)methylthio, triphenylmethylthio, cyano or mercapto), —S—X_2 or —O—X_2 (wherein X_2 is alkyl, phenyl, substituted phenyl, alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, or heteroarylcarbonyl), or



(Wherein one of X_3 and X_4 is hydrogen and the other is hydrogen or alkyl, or X_3 and X_4 when taken together with the carbon atom to which they are attached form a cycloalkyl group, and X_5 is formyl, alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, phenylalkylcarbonyl, (substituted phenyl)alkylcarbonyl, carboxyl, alkoxycarbonyl, aminocarbonyl, (substituted amino)-carbonyl, or cyano); and

Z is oxygen or sulfur;

wherein the terms "alkyl" and "alkoxy" refer to groups having 1 to 10 carbon atoms;

the term "cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms;

the terms "alkanoyl", "alkenyl", "alkynyl", "alkyn-1-yl" and "alken-1-yl" refer to groups having 2 to 10 carbon atoms;

the term "substituted phenyl" refers to a phenyl group substituted with 1, 2 or 3 amino, halogen, hydroxyl, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 cabon atoms or carboxyl groups;

the term "substituted alkyl" refers to alkyl groups substituted with one or more azido, amino, alkylamino, dialkylamino, (phenylalkyl)amino, (substituted phenylalkyl)amino, alkanoylamino, halogen, hydroxy, carboxy, cyano, alkoxycarbonyl, aminocarbonyl, alkanoyloxy, alkoxy, phenyloxy, (substituted phenyl)oxy, mercapto, alkylthio, phenylthio, (substituted phenyl)thio, alkylsulfinyl or alkylsulfonyl groups;

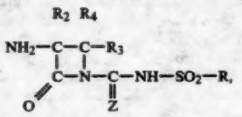
the term "heteroaryl" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, tr iazinyl, tetrazolyl or one of the above groups substituted with one or more halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, or substituted slkyl, wherein the alkyl group has 1 to 4 carbon atoms, groups;

the term "a 5, 6 or 7-membered heterocycle" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-

triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, tetrazolyl, piperidinyl, piperazinyl, imidazolylidinyl, oxazolylidinyl, pyrrolidinyl, tetrahydropyrimidinyl, dihydrothiazolyl or hexahydroazepinyl or one of the above groups substituted with one or more oxo, halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furylimino, benzylimino or substituted alkyl, wherein the alkyl group has 1 to 4 carbon atoms, groups;

the term "substituted amino" refers to a group having the formula $-NY_1Y_2$ wherein Y_1 is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl, and Y_2 is alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, hydroxy, cyano, alkoxy, phenylalkoxy or amino.

31. A β-lactam having the formula

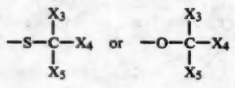


or a salt thereof; wherein

R is alkyl, alkenyl, alkynyl, substituted alkyl, phenyl, substituted phenyl, a 5, 6 or 7-membered heterocycle, phenylalkyl, (substituted phenyl)alkyl, (5, 6 or 7-membered heterocycle)alkyl, or $-NR_aR_b$ wherein R_a and R_b are the same or different and each is hydrogen, alkyl, substituted alkyl, phenyl, substituted phenyl, phenylalkyl, or (substituted phenyl)alkyl or one of R_a and R_b is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl and the other is amino, alkanoylamino, arylcarbonylamino, alkoxycarbonylamino, alkylsulfonylamino, alkylamino, dialkylamino, phenylamino, (substituted phenyl)amino, hydroxy, cyano, alkoxy, phenyloxy, (substituted phenyl)oxy, phenylalkoxy, (substituted phenyl)alkoxy, a 5, 6 or 7-membered heterocycle, (5, 6 or 7-membered heterocycle)alkyl, (5, 6 or 7-membered heterocycle)alkoxy, alkylsulfonyl, alkylmethyleneamino, phenylmethyleneamino or (substituted phenyl)methyleneamino;

R_2 is hydrogen or methoxy;

R_3 and R_4 are the same or different and each is hydrogen, alkyl, cycloalkyl, phenyl or substituted phenyl, or one of R_3 and R_4 is hydrogen and the other is alkoxycarbonyl, alken-1-yl, alkyn-1-yl, 2-phenylethenyl, 2-phenylethynyl, carboxyl, $-CH_2X_1$ (wherein X_1 is azido, amino, hydroxy, alkanoylamino, alkylsulfonyloxy, phenylsulfonyloxy, (substituted phenyl)sulfonyloxy, phenyl, substituted phenyl, halogen, benzylthio, (substituted phenyl)methylthio, triphenylmethylthio, cyano or mercapto), $-S-X_2$ or $-O-X_2$ (wherein X_2 is alkyl, phenyl, substituted phenyl, alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, or heteroarylcarbonyl), or



(wherein one of X_3 and X_4 is hydrogen and the other is hydrogen or alkyl, or X_3 and X_4 when taken together with the carbon atom to which they are attached form a cycloalkyl group, and X_5 is formyl, alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, phenylalkylcarbonyl, (substituted phenyl)alkylcarbonyl, carboxyl, alkoxycarbonyl, aminocarbonyl, (substituted amino)-carbonyl, or cyano); and

Z is oxygen or sulfur;

wherein the terms "alkyl" and "alkoxy" refer to groups having 1 to 10 carbon atoms;

the term "cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms;

the terms "alkanoyl", "alkenyl", "alkynyl", "alkyn-1-yl" and "alken-1-yl" refer to groups having 2 to 10 carbon atoms;

the term "substituted phenyl" refers to a phenyl group substituted with 1, 2 or 3 amino, halogen, hydroxyl, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or carboxyl groups;

the term "substituted alkyl" refers to alkyl groups substituted with one or more azido, amino, alkylamino, dialkylamino, (phenylalkyl)amino, (substituted phenylalkyl)amino, alkanoylamino, halogen, hydroxy, carboxy, cyano, alkoxycarbonyl, aminocarbonyl, alkanoyloxy, alkoxy, phenyloxy, (substituted phenyl)oxy, mercapto, alkylthio, phenylthio, (substituted phenyl)thio, alkylsulfinyl or alkylsulfonyl groups;

the term "heteroaryl" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, tetrazolyl or one of the above groups substituted with one or more halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl or substituted alkyl, wherein the alkyl group has 1 to 4 carbon atoms, groups;

the term "a 5, 6 or 7-membered heterocycle" refers to pyridinyl, fuuranyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, tetrazolyl, piperidinyl, piperazinyl, imidazolylidinyl, oxazolylidinyl, pyrrolidinyl, tetrahydropyrimidinyl, dihydrothiazolyl or hexahydroazepinyl or one of the above groups substituted with one or more oxo, halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furylimino, benzylimino or substituted alkyl, wherein the alkyl group has 1 to 4 carbon atoms, groups;

the term "substituted amino" refers to a group having the formula $-NY_1Y_2$ wherein Y_1 is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl, and Y_2 is alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, hydroxy, cyano, alkoxy, phenylalkoxy or amino.

4,587,048

PROCESS FOR THE MANUFACTURE OF 4-THIOAZETIDINONE COMPOUNDS

Gottfried Sedelmeier, Ehrenkirchen-Norsingen, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

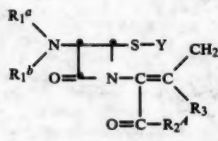
Continuation of Ser. No. 375,608, May 6, 1982, abandoned. This application Apr. 20, 1984, Ser. No. 601,747

Claims priority, application Switzerland, May 19, 1981, 3245/81

Int. Cl.[4] **C07D** *205/08, 401/06, 403/06, 401/12*

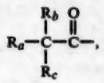
U.S. Cl. 260—239 A **21 Claims**

1. Process for the manufacture of 4-thioazetidinone compounds of the formula



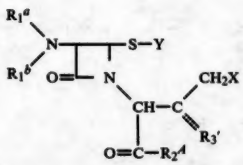
(I)

in which R_1^a represents an acyl group Ac of the formula



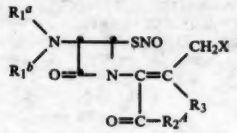
(IA)

in which (1) R_a represents phenyl that is unsubstituted or substituted by hydroxy, protected hydroxy, lower alkyl, lower alkoxy, lower alkanoyloxy, benzoyloxy, halogen, lower alkylsulphonylamino, nitro or aminomethyl that is unsubstituted or substituted by lower alkyl and that is optionally protected; or thienyl, furyl, cyclohexadienyl or cyclohexenyl each of which is substituted by lower alkyl or aminomethyl that is unsubstituted or substituted by lower alkyl and that is optionally protected; or thiazolyl substituted by di-lower alkylamino or protected amino; R_b represents hydrogen and R_c represents hydrogen, hydroxy, protected hydroxy, protected amino, carboxyl or sulpho; or in which (2) R_a represents protected 3-amino-3-carboxypropyl; cyano; 1-tetrazolyl; phenoxy that is unsubstituted or substituted by hydroxy, protected hydroxy, lower alkyl, lower alkoxy, lower alkanoyloxy, benzoyloxy, halogen, lower alkylsulphonylamino, nitro or aminomethyl that is unsubstituted or substituted by lower alkyl and that is optionally protected; or pyridylthio, and R_b and R_c represent hydrogen, or in which (3) R_a represents phenyl that is unsubstituted or substituted by hydroxy, protected hydroxy, lower alkyl, lower alkoxy, lower alkanoyloxy, benzoyloxy, halogen, lower alkylsulphonylamino, nitro or by aminomethyl that is unsubstituted or substituted by lower alkyl and that is optionally protected; or thienyl or furyl each of which is substituted by lower alkyl or aminomethyl that is unsubstituted or substituted by lower alkyl and that is optionally protected; or thiazolyl substituted by di-lower alkylamino or protected amino; and R_b and R_c together represent syn-lower alkoxyimino; and $R_1{}^b$ represents hydrogen; $R_2{}^d$ represents lower alkoxy; 2-halo-lower alkoxy; 2-lower alkylsulphonyl-lower alkoxy; 2-lower alkenyloxy; methoxy mono- or di-substituted by phenyl that is optionally substituted by lower alkoxy and/or nitro; trityloxy; or phenoxy that is optionally substituted by nitro or halogen; R_3 is methyl, hydroxy, lower alkoxy, phenyl-lower alkoxy, lower alkanoyloxy, sulphonyloxy, nitrito, phosphinoyloxy, phosphoryloxy, halogen, cyano, nitro, or amino that is di-substituted by lower alkyl, lower alkoxy-lower alkyl, lower alkylthio-lower alkyl, phenyl and/or cycloalkyl or that has as substituent lower alkylene or lower alkylene that is interrupted by oxygen, sulphur or optionally lower alkylated nitrogen; X represents hydrogen or halogen and Y represents a radical $-SR_4$ or $-SO_2-R_5$ is which R_4 represents thiadiazolyl, oxathiazolyl, diazolyl, oxazolyl, thiazolyl, benzoxazolyl or benzthiazolyl, each of which is optionally substituted by lower alkyl, and R_5 represents lower alkyl, cycloalkyl; or phenyl or naphthyl each of which is unsubstituted or substituted by lower alkyl, lower alkoxy, halogen, phenyl, phenoxy or nitro; or, when R_3 represents hydroxy or methyl, isomers thereof represented by the formula



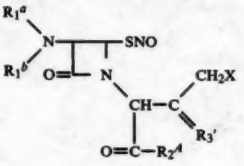
(IB)

wherein R_3' is oxo or methylene, characterised in that a compound of the formula



(III)

or, when R_3 represents hydroxy or methyl, an isomer thereof represented by the formula IIIB



IIIB

wherein R_3' represents oxo or methylene is treated with a nitrosating agent and a compound of the formula H-Y (IV).

4,587,049

AZETIDINONE ACETIC ACID DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Károly Lempert; Ferenc Bartha; Gábor Doleschall; József Fetter; Gyula Hornyák; József Nyitrai; Gyula Siming, all of Budapest, and Károly Zauer, Szentendre, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar RT, Budapest and Byogal Gyogyszergyar, Debrecen, both of, Hungary

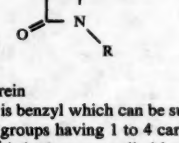
Filed Nov. 7, 1983, Ser. No. 549,681

Claims priority, application Hungary, Nov. 5, 1982, 3560/82

Int. Cl.[4] C07D *205/08*

U.S. Cl. 260—239 A **5 Claims**

1. A compound of the Formula (IX)



(IX)

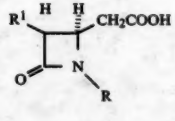
wherein

R is benzyl which can be substituted by one or more alkoxy groups having 1 to 4 carbon atoms;

R^1 is hydrogen or alkyl having 1 to 4 carbon atoms; and

Z is C_1 to C_4 alkyl.

3. A compound of the formula (X)



(X)

wherein

R is a benzyl group which can be substituted by one or more alkoxy groups having 1 to 4 carbon atoms and R^1 is hydrogen or alkyl having 1 to 4 carbon atoms.

4,587,050

SUBSTITUTED ENANTHOLACTAM DERIVATIVES AS ANTIHYPERTENSIVES

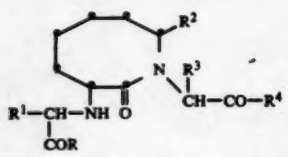
Elbert E. Harris, Westfield; Eugene D. Thorsett, Fanwood, and Arthur A. Patchett, Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 394,971, Jul. 2, 1982, abandoned, which is a continuation-in-part of Ser. No. 280,971, Jul. 7, 1981, abandoned, which is a continuation-in-part of Ser. No. 179,141, Aug. 18, 1980, abandoned. This application Feb. 11, 1985, Ser. No. 700,223

Int. Cl.[4] C07D 225/02

U.S. Cl. 260—239.3 R 13 Claims

1. A compound of the formula:



wherein

R and R^4 are the same or different and are
hydroxy,
lower alkoxy,
lower alkenoxy,
diloweralkylamino lower alkoxy,
acetylaminoethoxy;
nicotinoylaminoethoxy;
succinimidoethoxy;
pivaloyloxyethoxy;
arloweralkoxy,
amino,
hydroxyamino;

R^1 is
hydrogen,
alkyl, alkenyl, and alkynyl of from 1 to 12 carbon atoms which include straight chain and branched groups;
cycloalkyl groups;
substituted loweralkyl wherein the substituent(s) can be halo, hydroxy, lower alkoxy or aryloxy,
amino, loweralkylamino, aminoloweralkylthio, hydroxy, aminoloweralkoxy, diloweralkylamino, acetamido; benzamido; arylamino, guanidino, phthalimido, mercapto, loweralkylthio or arylthio, carboxy, carboxamido or carboloweralkoxy, arloweralkyl, arloweralkenyl, heteroarlower alkyl or heteroarlower alkenyl containing one heteroatom,
substituted arloweralkyl, or substituted heteroarlower alkyl containing one heteroatom, wherein the aryl or heteroaryl substituent(s) is halo, dihalo, lower alkyl, hydroxy, lower alkoxy, amino aminomethyl, phenyloxy, acetamido; benzamido; dilower alkylamino, loweralkylamino, carboxyl, haloloweralkyl;
substituted arloweralkyl or substituted heteroarloweralkyl containing one heteroatom, wherein the alkyl portion can be substituted by amino, hydroxy, acetamido or benzamido:

R^3 is hydrogen, lower alkyl, phenyl, phenyl lower alkyl, hydroxy phenyl lower alkyl, hydroxy lower alkyl, amino lower alkyl, acetamido or benzamido, lower alkyl, guanidino lower alkyl, imidazolyl lower alkyl, indolyl lower alkyl, mercapto lower alkyl or lower alkyl thio lower alkyl;

R^2 is hydrogen lower alkyl, cycloalkyl, aminoalkyl, hydroxyalkyl, aryl, substituted aryl, heteroaryl containing one heteroatom, aralkyl, heteroaralkyl containing one heteroatom, or substituted aryl wherein the substitutent is halo, alkyl, aminoalkyl, or alkoxy;

wherein in the foregoing R-R_4 groups inclusive:
the alkyl groups contain 2–12 carbon atoms; the loweralkyl groups contain 1–8 carbon atoms; the alkenyl and alkynyl grouPs contain 2–12 carbon atoms;
the loweralkenyl and loweralkynyl groups contain 2–8 carbon atoms;
aryl and the prefix "ar" denote unsubstituted aromatic rings of 6–12 carbon atoms;
the cycloalkyl groups are unsubstituted alkyl rings of 3–10 carbon atoms;
hetero denotes the heteroatoms N, O or S;
heteroaryl denotes an aryl group containing a heteroatom;

and, the pharmaceutically acceptable salts thereof.

4,587,051

DESULFONATION PROCESS FOR PREPARING 2-AZETIDINONES

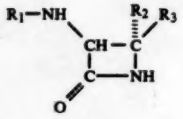
William H. Koster, East Amwell, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 514,730, Jul. 18, 1983, abandoned. This application May 21, 1984, Ser. No. 612,192

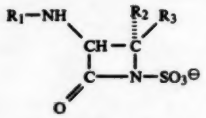
Int. Cl.[4] C07D 205/08, 403/04, 401/04, 405/04

U.S. Cl. 260—239 A 20 Claims

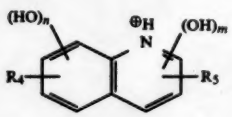
1. A process for preparing a compound having the formula



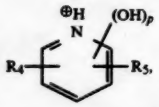
which comprises heating a solution containing an anion having the formula



and a cation having the formula



or a cation having the formula



with the proviso that if the cation used does not contain a hydroxy substituent, a nucleophile having the formula

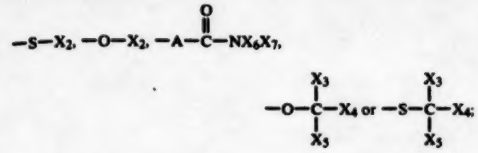
R_6—OH

must also be present, wherein

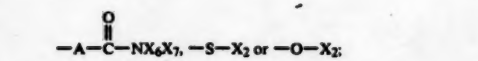
R_1 is an acyl group derived from a carboxylic acid;

R_2 and R_3 are the same or different and each is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, phenyl, substituted phenyl or a 4, 5, 6 or 7-membered heterocycle, or one of R_2 and R_3 is hydrogen and the other is azido, halomethyl,

dihalomethyl, trihalomethyl, alkoxycarbonyl, 2-phenylethenyl, 2-phenylethynyl,



wherein X_1 is azido, amino, hydroxy, alkanoylamino, phenylcarbonylamino, (substituted phenyl)carbonylamino, alkylsulfonyl- oxy, phenylsulfonyloxy, (substituted phenyl)sulfonyloxy, phenyl, substituted phenyl, cyano,



X_2 is alkyl, substituted alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, alkanoyl, phenylalkanoyl, (substituted phenyl)alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, or heteroarylcarbonyl; one of X_3 and X_4 is hydrogen and the other is hydrogen or alkyl, or X_3 and X_4 when taken together with the carbon atom to which they are attached form a cycloalkyl group; X_5 is formyl, alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, phenylalkylcarbonyl, (substituted phenyl)alkylcarbonyl, carboxyl, alkoxycarbonyl, aminocarbonyl, (substituted amino)carbonyl, or cyano; A is —CH=CH—, $-(CH_2)_n-$, $-CH_2-O-$, $-CH_2-NH-$ or $-CH_2-S-CH_2$; n is 0, 1 or 2; and X_6 and X_7 are the same or different and each is hydrogen, alkyl, phenyl or substituted phenyl, or X_6 is hydrogen and X_7 is amino, substituted amino, alkanoylamino or alkoxy, or X_6 and X_7 when taken together with the nitrogen atom to which they are attached form a 4, 5, 6 or 7-membered heterocycle;

R_4 and R_5 are the same or different and each is hydrogen, alkyl, substituted alkyl, phenyl, substituted phenyl, halogen, alkoxy, phenyloxy, (phenylcarbonyl)oxy, alkanoyloxy, alkanoylamino or (phenylcarbonyl)amino;

R_6 is hydrogen, alkyl, or phenyl; and

n is 0 or 1, m is 0 or 1 and the sum of n+m is 0 or 1;

wherein the terms "alkyl" and "alkoxy" refer to groups having 1 to 10 carbon atoms;

the term "cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms;

the term "substituted alkyl" refers to alkyl groups substituted with one or more azido, amino, halogen, hydroxy, carboxyl, cyano, alkoxycarbonyl, aminocarbonyl, alkanyoyloxy, alkoxy, phenyloxy, (substituted phenyl)oxy, mercapto, alkylthio, phenylthio, (substituted phenyl)thio, alkylsulfinyl or alkylsulfonyl groups;

the terms "alkanoyl", "alkenyl" and "alkynyl" refer to groups having 2 to 10 carbon atoms;

the term "substituted phenyl" refers to a phenyl group substituted with 1, 2 or 3 amino halogen, hydroxyl, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or carboxyl groups;

the term "substituted amino" refers to a group having the formula $-NY_1Y_2$ wherein Y_1 is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl and Y_2 is alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, hydroxy, cyano, alkoxy, phenylalkoxy or amino;

the term "heteroaryl" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3,-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, or tetrazolyl or one of the above groups substituted with one or more halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl or substituted alkyl, wherein the alkyl group has 1 to 4 carbon atoms, groups; and

the term "a 4, 5, 6 or 7-membered heterocycle" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazoyl, triazinyl, tetrazolyl, azetinyl, oxetanyl, thietanyl, piperidinyl, piperazinyl, imidazolidinyl, oxazolidinyl, pyrrolidinyl, tetrahydropyrimidinyl, dihydrothiazolyl or hexahydroazepinyl or one of the above groups substituted with one or more oxo, halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, or substituted alkyl, wherein the alkyl group has 1 to 4 carbon atoms, groups.

4,587,052

1H-PYRROLO-[2,1-C][1,4]BENZODIAZEPINE-2-ACRYLAMIDE COMPOUNDS HAVING ANTITUMOR ACTIVITY

Yasuo Ueda, Hirakata; Yusei Shiraga, Kobe; Satoshi Morimoto, Nagaokakyo; Yoshio Kagitani, Kashihara, all of Japan; Satoshi Funakoshi, Los Angeles, Calif., and Tadakazu Suyama, Tsuzuki, Japan, assignors to The Green Cross Corporation, Osaka, Japan

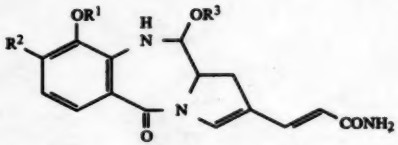
Filed Feb. 8, 1984, Ser. No. 578,032

Claims priority, application Japan, Feb. 10, 1983, 58-20798; Feb. 28, 1983, 58-31980

Int. Cl.⁴ C07D *487/04*

U.S. Cl. 260—239.3 T **19 Claims**

1. A benzodiazepin compound represented by the following formula or a pharmaceutically acceptable salt thereof:



wherein

R^1 is —COR^4 where R^4 is —Y—COOH or —Y'—O—Y''—COOH in which Y, Y' and Y'' are independently a C_{1-15} alkylene group or a phenylene group, a C_{1-8} alkyl group or a phenyl —C_{1-4} alkyl group having a substituent selected from a carboxyl group, an amino group and a cyano group,

R^2 is a lower alkyl group, and

R^3 is a hydrogen atom or a lower alkyl group.

4,587,053

PREPARATION OF OXAZOLINES

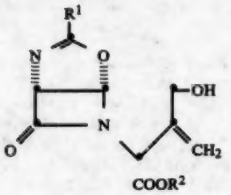
Robin D. G. Cooper; John M. Morin, Jr., both of Indianapolis, Ind., and Lynn R. Peters, Defiance, Ohio, assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 26, 1984, Ser. No. 604,282

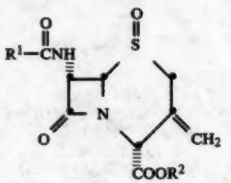
Int. Cl.⁴ C07D *498/04*

U.S. Cl. 260—245.4 **10 Claims**

1. A process for preparing a compound of the formula



which comprises reacting a triaryl phosphine, trialkyl phosphine, tri(methoxyphenyl)-phosphine, trithienylphosphine, tricyanoethyl-phosphine, tricyclohexylphosphine, or ethyldicylopropylphosphine with a 3-exomethylene cepham sulfoxide of the formula



wherein:

R^1 is a monovalent residue of a carboxylic acid less the carbonyl group; and

R^2 is a carboxy protecting group.

4,587,054

SYNTHESIS OF HYDROPHILIC PHENOL ESTER DERIVATIVES

Frederick E. Hardy, Gosforth, England, and James E. Thompson, Cincinnati, Ohio, assignors to The Procter & Gambel Company, Cincinnati, Ohio

Filed Sep. 26, 1983, Ser. No. 536,461

Claims priority, application United Kingdom, Sep. 28, 1982, 8227674

Int. Cl.[4] C09F *5/08, 7/10*

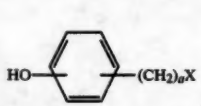
U.S. Cl. 260—410.5 **8 Claims**

1. A method of preparing a substituted phenol ester comprising the steps of:

(a) reacting a C_2–C_3 alkanoic anhydride with a linear or nonlinear, cyclic or acyclic unsubstituted C_6–C_{18} aliphatic carboxylic acid in a molar ratio of anhydride:acid of at least 0.5:1;

(b) volatilizing and removing the excess C_2–C_3 alkanoic anhydride and any C_2–C_3 carboxylic acid formed during the reaction, whilst maintaining the C_6–C_{18} acid anhydride in a fluid state;

(c) reacting the C_6–C_{18} acid anhydride with a substituted phenol at temperatures between about 80° and about 120° C. in the presence of a strong acid catalyst, or at temperatures between about 180° and about 220° C. in the presence of a base catalyst, the substituted phenol having the general formula



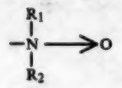
wherein X is selected from

(i) —COOH

(ii) $—OSO_3M$

(iii) $—SO_3M$

(iv)



(v) $—N^+R_1R_2R_3Y^-$

wherein M is alkali metal, or alkaline earth metal, each of R_1, R_2 and R_3 is a C_1–C_3 alkyl group, a is 0 or 1 and Y is a hydrophilic group selected from halide, methosulphate and ethosulphate radicals; and

(d) recovering the substituted C_6–C_{18} acyloxy benzene from the reaction mixture.

4,587,055

POLYMERIZED VESICLES AND COMPOUNDS FOR THEIR PREPARATION

Steven L. Regen, Milwaukee, Wis., assignor to Research Corporation, New York, N.Y.

Division of Ser. No. 382,296, May 26, 1982, Pat. No. 4,485,045, which is a continuation-in-part of Ser. No. 280,633, Jul. 6, 1981, abandoned. This application Jun. 8, 1984, Ser. No. 618,634

Int. Cl.[4] C11C *1/00*; C07C *57/02, 69/54*

U.S. Cl. 260—413 **15 Claims**

1. A compound of the formula

$$[R_4CH{=}CR_3{-}CO{-}O(CH_2)_n{-}CO{-}]_2{-}O$$

in which n is greater than 6 and R_3 and R_4 are each hydrogen or methyl.

4,587,056

PROCESS FOR PRODUCING AN ALIPHATIC ISOCYANATE

Shinsuke Fukuoka, and Tomonari Watanabe, both of Kurashiki, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 10, 1985, Ser. No. 721,696

Claims priority, application Japan, Apr. 26, 1984, 59-82858; Oct. 26, 1984, 59-224118

Int. Cl.[4] C07C *118/00*

U.S. Cl. 560—341 **17 Claims**

1. A process for producing an aliphatic isocyanate from an aliphatic primary amine, which comprises:

(a) a carbonylation step in which an aliphatic primary amine is allowed to react with carbon monoxide at a temperature of about 100 to about 250° C. in the presence of an aromatic hydroxyl compound having a pKa value of not more than 11, molecular oxygen and a catalyst system comprising:

(1) at least one member selected from palladium and rhodium metals and compounds containing palladium or rhodium and

(2) at least one member selected from iodine and bromine and compounds containing iodine or bromine,

to obtain a mixture of carbonylated products comprising an aliphatic isocyanate as a main-product and at least one urethane compound as a by-product; and

(b) separating and recovering said aliphatic isocyanate comprising a pyrolysis reaction-distillation in which said mixture of carbonylated products is heated at a temperature of from about 100° to about 300° C. to decompose said at least one urethane compound present in said mixture of carbonylated products to an aliphatic isocyanate and an aromatic hydroxyl compound, and recovering both said aliphatic isocyanate initially contained in said mixture of carbonylated products and said aliphatic isocyanate formed by decomposition of said urethane compound by separating the lower boiling component of either of said the aliphatic isocyanate or said aromatic hydroxyl compound in gaseous state.

4,587,057

β-HYDROXYCYCLOPENTYLPEROXIDE COMPOUNDS AND THE USE THEREOF

Hitoshi Yuasa, Yokohama; Mitsuo Matsuno, Kawasaki, and Hirosuke Imai, Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Japan

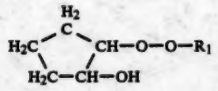
Filed Jul. 8, 1983, Ser. No. 512,199

Claims priority, application Japan, Sep. 13, 1982, 57-159276; Jan. 7, 1983, 58-890; May 23, 1983, 58-90330

Int. Cl.[4] C07C *179/18, 179/06, 179/02*

U.S. Cl. 260—453 9 Claims

1. Beta-hydroxycyclopentylperoxide compound of the formula:



wherein R_1 represents a hydrogen atom, a hydrocarbon of 1 to 9 carbon atoms, or a —OH, =O, —Cl and —OOH substituted hydrocarbon of 1 to 9 carbon atoms.

4,587,058

DIISOCYANATES OF THE DIPHENYL METHANE SERIES AND PROCESSES FOR THE PRODUCTION THEREOF

Hartmut Knöfel, Odenthal-Erberich, and Michael Brockelt, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

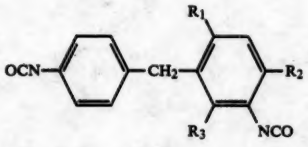
Filed Aug. 7, 1981, Ser. No. 290,983

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1980, 3032128

Int. Cl.[4] C07C *118/02, 119/048*

U.S. Cl. 560—347 12 Claims

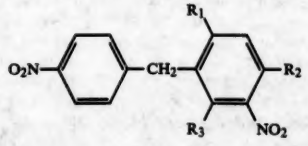
1. A process for the production of a diisocyanate corresponding to the general formula:



in which R_1, R_2 and R_3 represent hydrogen or a C_2–C_{12} alkyl group provided that two of the radicals R_1, R_2 and R_3 represent hydrogen and the third represents an alkyl group having from 2–12 carbon atoms,

comprising:

(a) reacting a 4-nitrobenzyl halide in the presence of a Friedel-Crafts catalyst with 1-alkyl-2-nitrobenzene and/or 1-alkyl-4-nitrobenzene and/or mixtures of these isomers and up to 15 wt % (based on whole mixture) 1-alkyl-3-nitrobenzene to form a dinitro compound corresponding to the general formula:



in which R_1, R_2 and R_3 are as defined above;

(b) separating the Friedel-Crafts catalyst from the product of (a);

(c) converting the product of (a) to a corresponding diamino compound by hydrogenating or reducing the nitro groups; and

(d) converting the diamino compound obtained in (c) to a diisocyanate by phosgenating the diamino compound.

4,587,059

PROCESS FOR PRODUCTION OF 2-CYANOACRYLATES FROM 2,4-DICYANOGLUTARATES

Hubert Harth, Duesseldorf; Willi Wuest, Ratingen; Hans-Athanas Bruhn, Guenzburg; Miklos Danielisz, Hanover, and Erbo Heinrich, Wennigsen, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 4, 1984, Ser. No. 596,753

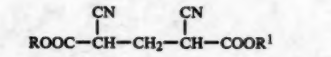
Claims priority, application Fed. Rep. of Germany, Apr. 7, 1983, 3312427

Int. Cl.[4] C07C *120/00, 121/30, 121/48, 121/60*

U.S. Cl. 558—400 8 Claims

1. A process for the preparation of monomeric 2-cyanoacrylates comprising the steps of

(a) reacting (i) a 2,4-dicyanoglutarate of the formula



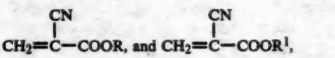
(I)

wherein RO and R^1O can be the same or different, and are derived from: C_{1-8} linear or branched alkanols; cyclohexanol; phenyl substituted C_{1-8} alkanols; lower alkenols; mono C_{1-8} alkyl ethers of ethylene glycol or propylene glycol; C_{9-19} linear unsubstituted, branched or cyclic monoalcohols or ether alcohols; or phenol; with

(ii) formaldehyde, cyclic or linear polymers of formaldehyde, or a mixture thereof,

in the presence of between about 0.5 and about 5 mols of water per mol of 2,4-dicyanoglutarate, at an acid pH of about 3 to slightly less than 7, and at a temperature of about 70° C. to about 140° C., to form an oligomeric intermediate product, and

(b) removing water that is present from step (a) and thermolyzing said oligomeric intermediate product for a period of time sufficient to effect its conversion to monomeric 2-cyanoacrylates of the formulae



(II)

wherein RO and R^1O have the meanings given above.

4,587,060

STABILIZATION OF CYANOHYDRINS

Thomas H. Colby, and Walter Dong, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 7, 1985, Ser. No. 742,501

Int. Cl.[4] C07C *121/75*

U.S. Cl. 558—304 18 Claims

1. A method of stabilizing a cyanohydrin or a solution thereof in an inert solvent comprising treating the cyanohydrin or solution thereof with a stabilizing amount of a substantially water-immiscible organophosphoric acid.

4,587,061

OXIDATIVE RING CLEAVAGE PROCESS

William H. Miller, Glendale, and Thomas E. Neumann, Creve Coeur, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jun. 6, 1985, Ser. No. 741,931

Int. Cl.[4] C07F *9/38*

U.S. Cl. 260—502.5 F 4 Claims

1. A process for the production of N-phosphonomethylgly-

cine which comprises reacting 4-morpholinylmethylphosphonic acid with an amount of an aqueous alkali metal hydroxide in excess of that required to neutralize the acid in an autoclave at a temperature of 200°–400° C. followed by acid neutralization of the reaction product to liberate N-phosphonomethylglycine.

4,587,062

METHOD OF PREPARING MAGNESIUM AND CALCIUM DIHYDROCARBYLDITHIOPHOSPHATE

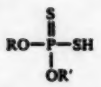
Jacob J. Habeeb, Sarnia, Canada, assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Filed May 2, 1984, Ser. No. 606,202

Int. Cl.[4] C07F 9/165

U.S. Cl. 558—133 10 Claims

1. A method for preparing magnesium and calcium dihydrocarbyl dithiophosphates comprising reacting elemental magnesium or calcium metal with a dihydrocarbyl dithiophosphoric acid having the formula:



where R and R' are hydrocarbyl radicals having from 1 to 18 carbon atoms, in the presence of an effective amount of methanol as a reaction promoter.

4,587,063

PROCESS FOR THE PREPARATION OF PHOSPHORIC DIESTERS

Tomihiro Kuroseki, Oosaka, and Norio Nishikawa, Wakayama, both of Japan, assignors to KAO Corporation, Tokyo, Japan

Filed Jul. 8, 1983, Ser. No. 511,948

Claims priority, application Japan, Jul. 15, 1982, 57-123280

Int. Cl.[4] C07F 9/09

U.S. Cl. 556—146 5 Claims

1. A process for the preparation of diesters characterized by adding, to a mixture of phosphoric esters comprising phosphoric monoesters and phosphoric diesters, a base in an amount of 0.5–1.3 equivalents based on phosphorus atoms contained in the mixture at a temperature of 100°–200° C., thereby converting the phosphoric monoesters into orthophosphoric acid and organic hydroxyl compounds by hydrolysis, and removing the orthophosphoric acid and organic hydroxyl compounds from the mixture.

4,587,064

AERATION APPARATUS FOR LARGE WATERS

Albert Blum, Scheiderhöhe, 5204 Lohmar 1, Fed. Rep. of Germany

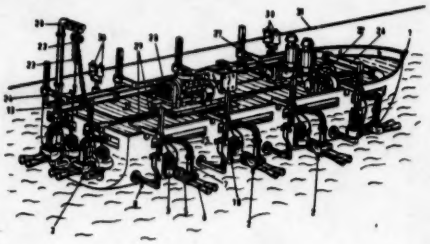
Filed Nov. 7, 1984, Ser. No. 669,084

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1983, 3340420

Int. Cl.[4] C02F 1/74

U.S. Cl. 261—37 12 Claims

1. Aeration apparatus for large waters, consisting of one float element and a plurality of aerator units supported thereby, characterized in that the float element is a walk-on boat hull (1;32) wherein the aerator units (2; 33; 34) are arranged all around the boat hull and are attached to the exterior wall (9) of the boat hull (1; 32) and wherein at least one of the aerator units comprises an immersed aerator (2; 33) with a motor-driven pump, and a submerged electric motor to drive the pump, with a mixing chamber downstream of the latter, with an air pipe connected to the mixing chamber and with a single ejector leading out of the mixing chamber or a plurality of ejectors (6) pointing in approximately the same direction,



and that the aerator unit is provided as drive means for the boat hull (1; 32).

4,587,065

METHOD FOR PRODUCING LIGHT TRANSMITTING ARTICLE OF SYNTHETIC RESIN

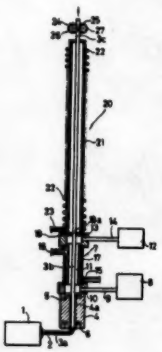
Maeda Kouichi, Takarazuka; Funaki Masaaki, Toyonaka; Yoshida Motoaki, Nishinomiya, and Ohtsuka Yasuji, Suginami, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Japan

Filed Jul. 2, 1984, Ser. No. 626,697

Claims priority, application Japan, Jul. 2, 1983, 58-120625; Jul. 2, 1983, 58-120626; Jul. 2, 1983, 58-120627; Jul. 2, 1983, 58-120628; Sep. 29, 1983, 58-181464; Oct. 11, 1983, 58-189615; Apr. 6, 1984, 59-68594

Int. Cl.[4] G02B 6/00

U.S. Cl. 264—1.5 12 Claims



1. A method of producing a light transmitting article from synthetic resin by partially polymerizing a monomer Ma which forms a network polymer Pa having a refractive index Na to form a self-supporting polymeric body material, and subsequently diffusing a monomer Mb, which forms a polymer Pb having a refractive index Nb different from the refractive index Na, into said body material and simultaneously polymerizing said monomer Mb, comprising the steps of continuously drawing out a polymeric body material from a molding means in which said body material has been formed and is ready for the diffusion of the monomer Mb, continuously passing said polymeric body material through a diffusion means and a heating means thereby diffusing the monomer Mb into said polymeric body material by the aid of said diffusion means, and then continuously heating said polymeric body material to complete polymerization of said polymeric body so that the

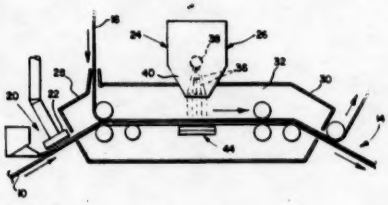
distribution of said monomer Mb is fixed in said polymeric body material.

4,587,066

METHOD AND APPARATUS FOR FORMING MAGNETIC RECORDING MEDIA

Tomas Rodriguez, Newton Highlands, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jul. 2, 1984, Ser. No. 627,054
Int. Cl.[4] B29B *13/08*; B29C *35/10*
U.S. Cl. 264—22 12 Claims



1. Apparatus comprising:

a device, having a surface from which emanates a magnetic field of high coercivity in a region adjacent thereto, said field having generally uniform and parallel lines of flux over a portion of the region;

means for supporting a substrate having an uncured coating containing magnetically orientable particles immediately adjacent said surface to effect alignment of the particles generally consistent with the flux of the field as they are in the region of the generally parallel portion of the magnetic field, the coating being disposed on one side of the substrate; and

means for directing electron beam energy through the coating from a side of the substrate opposite said device so that the coated substrate is in the generally parallel portion of the magnetic field to effect a freezing of the particles in the coating while the particles have been aligned by the generally parallel portion of the magnetic field.

9. A method of producing magnetic recording media comprising the steps of:

applying an uncured coating containing particles that can be oriented in a magnetic field onto a surface of a substrate;

establishing a magnetic field having lines of flux generally parallel to each other over a portion of their extent in a given direction from a given surface;

establishing relative motion between the field and a substrate having the uncured coating to effect alignment of the particles as they are in the generally parallel portion of the magnetic field immediately adjacent the given surface;

directing electron beam energy through the coating as it passes through the magnetic field for freezing the particles in the coating while the particles are maintained in alignment under the influence of the field, wherein electron beam energy is incident on the side of the substrate opposite the side facing said means for producing said field; and

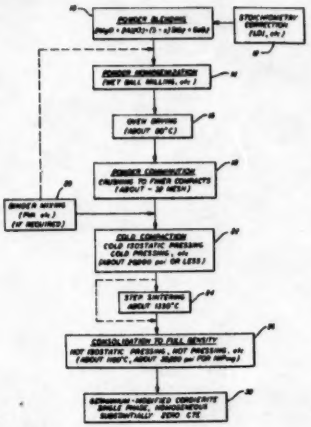
applying a strippable cover to a surface of the uncured coating prior to passing through the field so as to retain the particles in the coating and thereby inhibit coating surface disruptions otherwise caused by chaining of the particles subjected to the field, and stripping the cover from the coating following orientation of the particles in the field.

4,587,067

METHOD OF MANUFACTURING LOW THERMAL EXPANSION MODIFIED CORDIERITE CERAMICS

Dinesh K. Agrawal; Vladimir S. Stubican, both of State College, Pa., and Yogesh Mehrotra, Trumbull, Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jul. 20, 1984, Ser. No. 632,996
Int. Cl.[4] B32B *9/04*
U.S. Cl. 264—63 8 Claims



1. A method of fabricating germanium-cordierite ceramic body comprising the sequential steps of:

providing on a molecular basis, a powdered mixture of about 2 moles magnesium oxide, about 2 moles aluminum oxide, and about 5 moles divided between silicon dioxide and germanium oxide;

blending said powders;

homogenizing said powders until finely divided and thoroughly mixed;

oven drying said powders at a temperature of about 100° C.;

densifying said powders by grinding to about a −32 mesh;

cold compacting said powders into a desired shape by cold pressing said powders by building up the pressure in a series of gradual steps while holding the pressure constant at each step for a period of time sufficient to allow the system to reach equilibrium;

gradually heating said compact to a temperature at which reactive sintering occurs and a cordierite type structure is formed;

gradually cooling said structure; and

hot isotatic pressing said structure at a temperature of about 1100° C. and a pressure of about 30,000 psi to consolidate the sintered body to very nearly 100 percent of the theoretical density.

4,587,068

METHOD OF MAKING CERAMIC TAPES

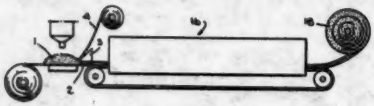
Vijay Borase, Wayne, N.J.; James F. Smith, Monroe, and Efraim Sagiv, Chester, both of N.Y., assignors to Materials Research Corporation, Orangeburg, N.Y.

Filed Jun. 24, 1983, Ser. No. 507,572
Int. Cl.[4] C04B *35/64*
U.S. Cl. 264—63 16 Claims

1. A method of preparing ceramic tapes comprising:

(1) physically mixing a slip comprising a ceramic powder, a

deflocculant, and at least one monomer, in the absence of either water or an inert volatile organic solvent; (2) forming the slip on a carrier surface; and (3) polymerizing the monomer.



4,587,069

PROCESS FOR PRODUCING COLOR DISPLAY MEANS

Gilbert K. Meloy, Cincinnati, Ohio, assignor to Twinoak Products, Inc., Piano, Ill.

Filed Oct. 31, 1983, Ser. No. 545,883
Int. Cl.[4] B29B *7/84;* B27N *3/02;* E03D *9/02;* A61L *2/16*
U.S. Cl. 264—102 5 Claims

BLENDING A MIX OF COLOR INDICATOR, MATRIX AGENT AND SOLUBILIZING AGENT WHILE DEAERATING THE MIX
COMPRESSING THE BLENDED MIX IN A MOLD TO FORM A TABLET (OPTIONAL DEAERATION)
COATING THE TABLET WITH A PROTECTIVE COATING

1. In a process for producing a color indicator tablet adapted for the detection of the depletion of an ingredient in a solution initially containing the ingredient, said tablet including a color indicator, a matrix agent, and a solubilizing agent, and wherein a protective coating is provided for the tablet, the improvement comprising the steps of:

(1) blending said indicator and said agents in a manner such that a minimum of air is entrained, and to achieve a homogenous blend;

(2) compressing said blend into a tablet such that the percent voids by volume in said tablet is less than about 10%, said compressing involving a press pressure from between about 5,000 and about 25,000 pounds per square inch; a pressure development time of from between about 0.5 and about 5 seconds; and a press dwell time of from between about 0.01 and about 3 seconds; and,

(3) coating said tablet with said protective coating, said coating being capable of degrading in the solution into which the color indicator tablet is placed.

4,587,070

METHOD FOR MANUFACTURE OF WATERPROOF FIBROUS PLATE

Hajime Niwa, and Katsumi Hironaka, both of Hiroshima, Japan, assignors to AOI Chemical, Inc., Hiroshima, Japan

Filed Mar. 29, 1984, Ser. No. 594,759
Claims priority, application Japan, Oct. 28, 1983, 58-201954
Int. Cl.[4] B29C *67/02*
U.S. Cl. 264—122 16 Claims

1. A method for manufacturing a waterproof sealant plate for concrete joints, which comprises the steps of uniformly mixing and dispersing fibrous raw material and a finely divided bituminous substance in water to produce an aqueous dispersion, adding a cationic asphalt emulsion to the aqueous dispersion, molding the aqueous dispersion into a plate, uniformly applying a mixed solution consisting of an anionic asphalt emulsion and an anionic or nonionic synthetic resin emulsion to the surface of the plate by spraying, and heating the plate with a hot press thereby melting the bituminous substance contained in the fibrous material and converting the plate into a waterproof sealant plate having the bituminous substance uniformly dispersed therein.

8. A method for manufacturing a waterproof sealant plate for concrete joints, comprising the steps of:

I. uniformly mixing and dispersing fibrous raw material and finely divided bituminous substance in water to produce an aqueous dispersion, said fibrous raw material comprising at least one member selected from the group consisting of vegetable fibers, cane fiber, ligneous fiber, bast fiber, cotton staple, used paper pulp and chemical pulp; wherein said bituminous substance comprises at least one member selected from the group consisting of natural asphalt, petrolic asphalt, petroleum pitch and coal tar pitch; and then

II. adding a cationic asphalt emulsion to the aqueous dispersion; and then

III. molding the aqueous dispertion into a plate; and then

IV. heating the plate with a hot press, thereby melting the bituminous substance and converting the plate into a waterproof sealant plate having the bituminous substance uniformly dispersed therein.

4,587,071

PRODUCTION OF POLYETHYLENE TEREPHTHALATE FILM FOR MAGNETIC RECORDING

Satoyuki Minami; Kazuhiro Tanaka, and Takeshi Nishioka, all of Ohtsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Division of Ser. No. 654,599, Sep. 26, 1984, Pat. No. 4,546,030, which is a division of Ser. No. 425,960, Sep. 28, 1982, Pat. No. 4,497,865. This application Jun. 24, 1985, Ser. No. 748,295
Claims priority, application Japan, Feb. 17, 1982, 57-22593; Mar. 5, 1982, 57-33801
Int. Cl.[4] B29C *55/14*
U.S. Cl. 264—210.7 25 Claims

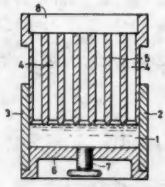
1. A process for producing a polyethylene terephthalate film which comprises extruding molten polyethylene terephthalate through a nozzle, cooling and solidifying the same to form a non-oriented sheet, stretching the sheet longitudinally in multiple stages to form a film having amorphous orientation factor of 0.6 to 1.0 and birefringence of 0.02 to 0.1, stretching the film transversely at a stretching ratio of 2.5 to 4.5, restretching the film biaxially at a stretching ratio of 1.5 to 2.5 in each direction and setting the film by heating to attain total-area stretching ratio of at least 27.

4,587,072

METHOD FOR SHAPING OR MOLDING STICK COSMETICS

Seiya Ohtomo; Minoru Aoki, and Yoshio Kasai, all of Shizuoka, Japan, assignors to Pola Chemical Industries, Inc., Japan

Filed Jan. 30, 1984, Ser. No. 575,221
Int. Cl.[4] B29C *39/02*
U.S. Cl. 264—297.8 1 Claim



1. A method for molding stick cosmetics, which comprises:

(A) closely fitting a molding block into a vertically extending annular member formed around a container charged with a liquid feed composition for solid cosmetics, said

molding block having a plurality of longitudinal slots therethrough which are open at both ends;

(B) compressing or compacting the liquid feed composition;

(C) filling said liquid feed composition into said longitudinal slots from the bottom thereof, causing said liquid feed composition to rise in said slots until it overflows from the top thereof and, thereafter;

(D) solidifying and drying the thus filled liquid feed composition.

4,587,073

METHOD OF MANUFACTURE OF A MULTILAYER CONTAINER OF PLASTIC MATERIAL

Kjell M. Jakobsen, Hjallese, Denmark, assignor to Platmanufaktur AB, Sweden

Continuation of Ser. No. 132,668, Mar. 21, 1980, abandoned, which is a continuation of Ser. No. 903,735, May 8, 1978, abandoned. This application May 2, 1984, Ser. No. 60o,286

Claims priority, application Sweden, May 13, 1977, 7705604

Int. Cl.[4] B29C *45/14*

U.S. Cl. 264—515 12 Claims

1. A method of producing a container of plastic material comprising forming a blank of a composite material of a plurality of layers in tubular form, said layers including an inner layer and at least one outer layer, said inner layer in the composite material being different from said at least one outer layer, said blank having one end which is initially tubular and open, closing said open end of the blank by the steps comprising heating said open end, and contacting said one end of the blank with a bowl-shaped holding means to close said blank by causing the open end of the inner layer to come together and penetrate through said at least one outer layer to the outer surface of the container to prevent closure of said outer layer and form an integrated region which consists completely of said material of said inner layer and which isolates the interior of the blank from said at least one outer layer, said inner layer being of a thickness of 20 to 50% of the total wall thickness of the blank outside said integrated region and blow molding said blank to form the container, the bottom of which includes said integrated region which consists of said material of said inner layer which not only isolates the interior of the blank from said at least one outer layer but also the outer central bottom surface of the container from said at least one outer layer.

4,587,074

MANUFACTURE OF ELASTOMERIC BLADDERS, PARTICULARLY FOR PRESSURE VESSELS

Jean P. De Loof, Brest, France, assignor to Olaer Industries S.A., Colombes, France

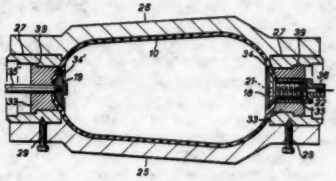
Filed Oct. 18, 1983, Ser. No. 543,083

Claims priority, application France, Oct. 22, 1982, 82 17696

Int. Cl.[4] B29C *49/20*

U.S. Cl. 264—516 6 Claims

1. The method of manufacturing an elastic bladder with at least one bonded rigid element having an aperture formed therein comprising the steps of providing a tube of raw elastomer introducing said tube into a mold having a mold surface substantially complementary to that of the desired bladder, said mold including an end portion closely encompassing an end of said tube and an insert movable axially within said end portion introducing said rigid element through said end of said tube into the interior thereof, thereafter causing said end portion of said tube to be deformed axially into engagement with said element by axial inward shifting movement of insert to thereby clamp said end portion of said tube between said insert and said element, closing said mold, introducing fluid into said



tube through said aperture of said element to thereby expand said tube against said mold surface, thereafter vulcanizing said shaped raw elastomer to thereby bond said element to said shaped elastomer, relieving the pressure inside said tube, opening the mold and removing the resultant bladder.

4,587,075

METHOD AND APPARATUS FOR MAKING DIMENSIONALLY STABLE THERMOPLASTIC TUBULAR ARTICLES

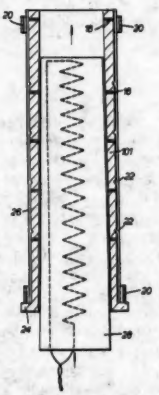
Peter E. Butcher, Hinton Waldrist, Near Faringdon; David A. Dick, Wantage; James W. Nicholas, Wantage; Melvin E. R. Robinson, Wantage, and Glyn Staines, Swindon, all of England, assignors to Metal Box p.l.c., Reading, England

Filed Apr. 12, 1984, Ser. No. 599,697

Claims priority, application United Kingdom, Apr. 22, 1983, 8310966

Int. Cl.[4] B29C *61/02*

U.S. Cl. 264—573 20 Claims



1. A method of making a thermoplastic tubular article which will be dimensionally stable up to a specific elevated temperature, comprising the steps of fitting an at least partly biaxially oriented tube of a crystallisable polymer having at least one open end over a mandrel whose temperature is below the glass transition temperature of the polymer and whose outer diameter is only slightly less than the internal diameter of the tube, clamping the tube to restrain axial shrinkage thereof, heating the mandrel internally to heat the tube to a temperature higher than the said specific elevated temperature so that, whilst restrained against axial shrinkage, the tube shrinks radially into contact with the mandrel but is restrained thereby from further radial shrinkage, maintaining the tube at said higher tempera-

ture for a time sufficient to ensure the required degree of dimensional stability, cooling the tube to a temperature below the said specific elevated temperature, releasing contact between the tube and mandrel by forcing fluid under pressure from inside the mandrel through a plurality of apertures in its surface to form a fluid cushion between the tube and mandrel, and removing the tube from the mandrel while the fluid cushion is in existence.

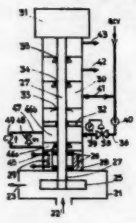
16. Apparatus for making a thermoplastic tubular article of a crystallisable polymer which is heat-set so as to be dimensionally stable up to a specific elevated temperature, comprising a mandrel having a plurality of apertures in its surface; heating means for heating the mandrel internally and thereby heating the article to a temperature higher than the specific elevated temperature; clamping means for clamping an at least partly biaxially oriented tube of the crystallisable polymer to restrain axial shrinkage of the tube; and a pressurised fluid supply for supplying fluid under pressure from inside the mandrel through said plurality of apertures in its surface, to release contact between the mandrel and a tube shrunk thereon.

4,587,076

SEALING DEVICE FOR THE DRIVE SHAFT OF A HIGH PRESSURE FLUID PUMP

Nicolaas Bonhomme, Pontoise, France, assignor to Framatome & Cie, Courbevoie, France

Filed May 17, 1982, Ser. No. 379,196
Claims priority, application France, May 21, 1981, 81 10128
Int. Cl.⁴ G21D *1/04*
U.S. Cl. 376—203 **2 Claims**



1. A pump for circulating a high pressure fluid, comprising a volute, a bladed wheel mounted on said volute, a shaft one end of which is connected to said wheel and the other end of which is connected to a drive motor outside said volute, a casing fixed to said volute around an aperture in said volute for the passage of said shaft, prolonging said volute and surrounding said shaft up to said drive motor, an annular space being provided between the internal surface of said casing and said shaft, and a set of seals disposed in said annular space in sequence along said shaft, at least one of said seals being of the hydrostatic type comprising two sealing elements respectively connected to said shaft and to said casing and maintaining a small space between them, the seal of said set which is disposed furthest upstream, i.e., closest to the interior of said volute, being of said hydrostatic type and limiting upstream of its sealing elements a portion of said annular space constituting a chamber in communication with the interior of said volute, said pump further comprising a supply circuit connected to said chamber at a supply point for feeding said chamber with a liquid at a pressure higher than the pressure of the fluid circulated by said pump, said pump further comprising

(a) an auxiliary seal of the mechanical type provided in addition to the seals of said set, said auxiliary seal comprising two sealing elements in rubbing contact and respectively connected to said shaft and to said casing within said chamber upstream of said supply point, thereby dividing said chamber into an upstream portion and a downstream portion;

(b) a conduit extending between said upstream and downstream portions of said chamber, said conduit being provided with a valve for selectively isolating and communicating said chamber portions; and

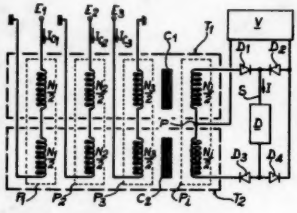
(c) a non-return valve connected in a bypass of said first-mentioned valve, said non-return valve being adapted to open when the pressure in said upstream chamber portion exceeds the pressure in said downstream chamber portion.

4,587,077

SAFETY ACTUATOR RELEASE DEVICE

Anatole Bessedine, Domene, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 10, 1982, Ser. No. 448,626
Claims priority, application France, Dec. 11, 1981, 81 23203
Int. Cl.⁴ G21C *7/00, 17/00*; G06G *7/14*
U.S. Cl. 376—215 **4 Claims**



1. A safety actuator release device, comprising, release means (P_i), one output (S) of said release means supplying an output signal which can have two logic states, one of said states corresponding to release of the actuator (D) and the other state corresponding to actuation of said actuator; testing and control means (P_1, P_2, P_3) for said release means (P_i), said testing and control means having two control inputs (E_1, E_2) receiving control signals from said release means in order that said output signal has one of two logic states and a test input (E_3) receiving a test signal, said output supplying in response to said test signal an output signal, whose logic state corresponds to the release of the actuator, and overriding any control signals which would otherwise cause an output signal corresponding to actuation of said actuator, said testing and control means (P_1, P_2, P_3,) comprising three primary windings of a magnetic amplifier, two of said primary windings (P_1, P_2) receiving direct currents corresponding to said control signals, and the remaining winding (P_3) being a test winding and receiving a direct current corresponding to the test signal, said release means being a secondary winding (P_i) of the magnetic amplifier, said secondary winding being connected to an alternating current supply, and said actuator (D) being connect to said secondary winding via a bridge rectifier (D_1, D_2, D_3).

4,587,078

INITIAL CHARGE CORE OF FAST BREEDER AND METHOD OF CHARGING THE CORE WITH FUEL

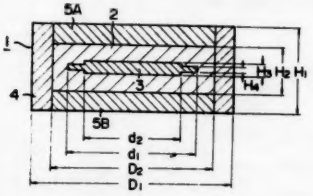
Kazuo Azekura, Ibaraki; Katsuyuki Kawashima, Hitachi; Kotaro Inoue, Ibaraki, and Sadao Uchikawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 26, 1982, Ser. No. 401,747
Claims priority, application Japan, Jul. 27, 1981, 56-117924
Int. Cl.⁴ G21C *19/00, 1/00*
U.S. Cl. 376—267 **8 Claims**

1. A method of renewing fuel in an initial charge core of a fast breeder, said initial charge core comprising a driver core region containing a fissile material, an external blanket region surrounding said driver core region and containing a fertile material, and an internal blanket region disposed in said driver core region and containing a fertile material, each of said regions being composed of a multiplicity of fuel assemblies, said fuel assemblies including first fuel assemblies each of

which constituting said external blanket region at its upper and lower ends, the driver core regions between said external blanket regions and said internal blanket region sandwiched between said driver core regions, said internal blanket region being enriched with a fissile material and the degree of enrichment in said internal blanket region being smaller than that in said driver core region, said method comprising the following steps (a) and (b):

(a) stopping the operation of said fast breeder with said initial charge core after a predetermined running period



has elapsed, and withdrawing said first fuel assemblies from said initial charge core; and

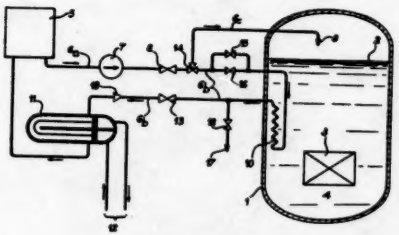
(b) charging second fuel assemblies in the portions of said initial charge core from which said first fuel assemblies have been withdrawn, each of said second fuel assemblies constituting said outer blanket regions at its upper and lower ends, drive core regions between said outer blanket regions and an internal blanket region sandwiched between said driver core regions, said internal blanket region containing a fertile material which internal blanket region is not enriched with fissile material.

4,587,079

SYSTEM FOR THE EMERGENCY COOLING OF A PRESSURIZED WATER NUCLEAR REACTOR CORE

Maurice Fajeau, and Sylvain Croxatto, both of Pertuis, France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 23, 1982, Ser. No. 351,453
Claims priority, application France, Feb. 24, 1981, 81 03632
Int. Cl.[4] G21C *15/18*
U.S. Cl. 376—282 **7 Claims**



1. In a water-cooled nuclear reactor of the type having a reactor vessel and a device for injecting low pressure emergency water into the top of the reactor vessel from a cold water tank, an emergency cooling system being a closed circuit comprising, in series, a low pressure pump connected to the cold water tank, a normally closed upstream valve connected to the pump, a first heat exchanger integrated into the reactor vessel and normally submerged in the reactor water, a three-way valve connected to the upstream valve and to a normally closed valve and a normally open valve which are connected in parallel between the three-way valve and an inlet of the first heat exchanger, the normally closed parallel-connected valve having a much higher flow rate than the normally open parallel-connected valve, a normally closed downstream valve connected to an outlet of the first heat exchanger, and a second heat exchanger connected to the downstream valve and to said cold water tank, the second heat exchanger being supplied with a secondary cooling water flow therethrough for removing heat from water flowing in said closed circuit, and the water injection device being connected to the three-way valve, the three-way valve being operable to supply water from the cold water tank alternatively to said water injection device or to said first heat exchanger.

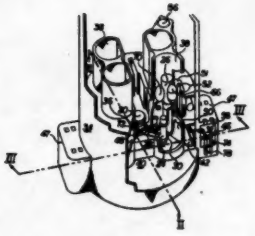
4. In a water-cooled nuclear reactor of the type having a device for injecting emergency replacement water under low pressure into a vessel of the reactor from a cold water tank, an emergency cooling system comprising, in series, a low pressure pump, an upstream normally closed valve, a heat exchanger integrated with the reactor vessel and normally immersed in the water in the reactor vessel, the pump, the upstream valve, and the heat exchanger being connected to said cold water tank so as to form a closed circuit, a three-way valve disposed between the upstream valve and the heat exchanger and being connected to the emergency water injection device, the three-way valve being operable to connect alternatively the water injection device or the heat exchanger to the pump such that water can be supplied from the cold water tank by the pump to either the water injection device or the heat exchanger, and a normally closed valve and a normally open valve connected in parallel between the heat exchanger and the upstream valve, the normally closed valve having a substantially higher flow rate than the normally open valve.

4,587,080

COMPARTMENTALIZED SAFETY COOLANT INJECTION SYSTEM

Forrest T. Johnson, Baldwin Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 5, 1982, Ser. No. 346,339
Int. Cl.[4] G21C *13/02*
U.S. Cl. 376—282 **20 Claims**



1. A nuclear reactor system wherein pressurized water coolant is circulated from the reactor vessel through at least one reactor coolant supply loop that includes a reactor coolant pump and a steam generator, said system being housed in a containment building, said system comprising:

a compartment that includes the reactor vessel;

a reactor coolant loop compartment corresponding to each reactor coolant loop that includes the reactor coolant pump and steam generator of a single reactor coolant supply loop, the loop compartment having a water-tight base and sidewalls satisfactory to contain leakage from the coolant loop within the loop compartment;

an emergency water storage tank within the reactor containment building that is in communication with the reactor coolant loop compartment through a spillway positioned to drain coolant leakage within the loop compartment above a given level, into the emergency water storage tank;

a pump module that is connected to the emergency water

storage tank and to the reactor vessel, said pump module being operative to draw coolant from the emergency water storage tank and supply it to the reactor vessel; and

a containment building sump located in a lower portion of the containment building separate and normally isolated from the emergency water storage tank and loop compartment, normally serving as a fluid collecting reservoir for substantially all non-radioactive fluids drained in the containment building from outside the loop compartment.

10. A pressurized water reactor system wherein primary coolant is circulated through a reactor from at least one reactor coolant supply loop, said reactor system having auxiliary systems that include an emergency core cooling system, a containment spray system, and a residual heat removal system, said reactor system comprising:

a containment building for housing the reactor, said containment building having watertight compartments for separately housing each of the reactor coolant supply loops;

a containment extension connected to the containment building and having at least one pump compartment that includes pumps and valves associated with said auxiliary systems;

a sump pump located within the pump compartment that pumps water that may leak from the pumps or valves in the pump compartment, out of the pump compartment and into an emergency water storage tank used for emergency core cooling, in response to a predetermined liquid level in said pump compartment; and

wherein the pump compartment is provided with heating, ventilating and air conditioning units that remove heat and steam developed by the pumps and convected by the reactor coolant.

11. An integrated nuclear power plant system housed in a containment building, said system comprising;

a pump module;

a refueling water storage tank connected to said pump module;

an emergency water storage tank located within the containment building and selectively connected to said pump module;

a residual heat removal heat exchanger that is connected to the pump module and to the reactor vessel by an injection line;

wherein said pump module comprises,

a low head pump connected to said refueling water storage tank,

a minimum flow heat exchanger connected in a feedback loop around said low head pump, and

a high head pump that is connected to the emergency water storage tank and to the injection line that is connected to the residual heat removal heat exchanger; and

an emergency letdown heat exchanger connected to the hot leg of the reactor cooling loop and to the emergency water storage tank such that the water can be circulted from the hot leg to the emergency letdown heat exchanger, to the emergency water storage tank, to the high head pump, and back to the reactor vessel through the injection line and the residual heat removal heat exchanger.

4,587,081

SLAB FOR CLOSING THE VESSEL OF A FAST NEUTRON NUCLEAR REACTOR

Claude Malaval, Antony, France, assignor to Novatome, Le Plessis Robinson, France

Filed Apr. 30, 1984, Ser. No. 605,090

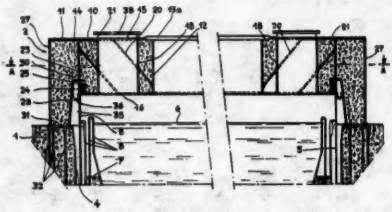
Claims priority, application France, May 6, 1983, 83-07583

Int. Cl.[4] G21C *13/02*

U.S. Cl. 376—287 **10 Claims**

1. In a fast neutron nuclear reactor comprising a concrete cylindrical well (1) with a vertical axis, a vessel contained in said well, an annular slab for closing said vessel resting horizontally on the upper part of said well, said slab (2) consisting of a composite structure of steel and concrete which at least partially carries said vessel (5) suspended from its lower part and which is pierced with cylindrical openings (18, 19) for the passage of components of said nuclear reactor into said vessel (5), the improvement that said slab comprises

(a) a first annular central part (10) the outer diameter of which is substantially equal to the diameter of said vessel (5) consisting of a steel caisson filled with concrete comprising an inner shell (12) and an outer shell (14) coaxial with the axis of said vessel well and connected by a horizontal lower sole plate (16) and a horizontal upper sole plate (15) and two first and second frusto-conical reinforcement webs (20, 21) coaxial with the axis of said vessel well and the same angle at the top, one of said webs being



connected to said outer shell (14) by its larger base and to said lower sole plate (16) by its smaller base, the other of said webs being connected to said upper sole plate (15) by its larger base and to said inner shell (12) by its smaller base, said smaller base of said first web (21) having substantially the same diameter as said larger base of said second web (20); and

(b) a second peripheral annular part (11) connected to said first annular part by its outer shell (14) forming the inner shell of said peripheral part (11), of greater height than the first part, strengthened by flat radial webs (25) extending in planes passing through the axis of said slab, said peripheral part (11) bearing with its lower part on the structure of said reactor (1).

4,587,082

PASSAGE THROUGH THE WALL OF A REINFORCED CONCRETE PRESSURE VESSEL

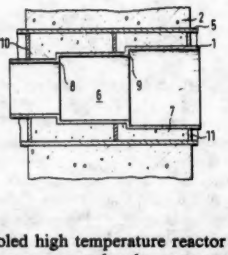
Josef Schoening, Hambruecken, and Hans-Georg Schwiers, Ketsch, both of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Cologne, Fed. Rep. of Germany

Continuation of Ser. No. 285,051, Jul. 20, 1981, abandoned. This application Nov. 30, 1983, Ser. No. 556,075

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1980, 300302

Int. Cl.[4] G21C *13/02*; G21F *3/00*

U.S. Cl. 376—291 **2 Claims**



1. In a gas cooled high temperature reactor having a reinforced concrete pressure vessel and a passage construction for a conduit through the wall of the reinforced concrete pressure vessel, the improvement comprising:

an outer tubular metal liner of a generally cylindrical config-

uration having a substantially constant diameter in direct contact with the concrete of the reinforced pressure vessel wall and extending through said wall;

an inner tubular member comprising a plurality of axially aligned cylindrical members of different diameter forming a generally stepped, elongate cylindrical passage arranged generally coaxially within said outer tubular metal liner along the entire length of said outer tubular metal liner within and through said passage to define therewith an axially stepped annular space;

solid radiation shielding material disposed within and substantially filling said stepped annular space;

at least two annular ring members rigidly connecting said inner and said outer tubular members; the first of said annular ring members positioned at the inside surface of the pressure vessel and the second of said annular ring members positioned at the outside surface of the pressure vessel;

a third annular ring member in the central portion of said passage; and

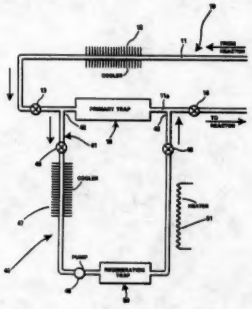
a welded gas-tight connection between said inner and said outer tubular members and each of said first and second annular ring members.

4,587,083

METHOD FOR REMOVING CESIUM FROM A NUCLEAR REACTOR COOLANT

Richard P. Colburn, Pasco, Wash., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 10, 1983, Ser. No. 521,815
Int. Cl.[4] G21C *19/42*
U.S. Cl. 376—313 **6 Claims**



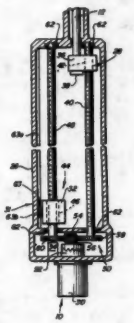
1. A method for removing cesium from a liquid metal circulating through a primary cooling system of a nuclear reactor comprising: providing a primary carbon packing trap in said primary system, continually absorbing cesium from said coolant onto said carbon packing trap at a relatively low temperature until said trap is substantially saturated with cesium, isolating said primary trap when saturated from said primary system by disconnecting said trap therefrom and connecting said primary trap to a closed regeneration flow system having a secondary carbon packing trap, said closed regeneration flow system being completely isolated from said primary coolant system and having a volume substantially smaller than said primary coolant system, increasing the temperature of the coolant passing through said primary trap, diffusing a portion of the cesium inventory on the surface of said primary trap further into the matrix thereof while dispersing a portion of said cesium inventory into said coolant circulating through said regeneration flow system, reducing the temperature of said coolant passing through said secondary trap, and physically and chemically absorbing cesium from the coolant in said regeneration flow system onto said secondary carbon packing trap until cesium equilibrium between said traps is reached whereby the primary trap is reconditioned for further usage when reconnected to the primary system.

4,587,084

CONTROL ROD DRIVE

Basil C. Hawke, Solana Beach, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 24, 1983, Ser. No. 526,349
Int. Cl.[4] G21C *9/02*
U.S. Cl. 376—336 **9 Claims**



1. A reactor core, one or more control rods, and a control rod drive for selectively inserting and withdrawing said one or more control rods into and from said reactor core, comprising:

a support structure secured beneath said reactor core;

control rod positioning means supported by said support structure for movably supporting said control rod for movement between a lower position wherein said control rod is located substantially beneath said reactor core and an upper position wherein at least an upper portion of said control rod extends into said reactor core;

transmission means;

primary drive means connected with said control rod positioning means by said transmission means for positioning said control rod under normal operating conditions;

emergency drive means for moving said control rod from said lower position to said upper position under emergency conditions, said emergency drive means including a weight movable between an upper and a lower position, means for movably supporting said weight, and means for transmitting gravitational force exerted on said weight to said control rod positioning means to move said control rod upwardly when said weight is pulled downwardly by gravity;

said transmission means connecting said control rod positioning means with said emergency drive means so that said primary drive means effects movement of said weight and said control rod in opposite directions under normal conditions, thus providing counterbalancing to reduce the force required for upward movement of said control rod under normal conditions; and

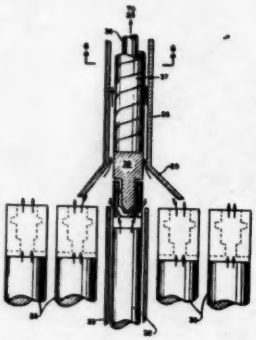
restraint means for restraining the fall of said weight under normal operating conditions and disengaging said primary drive means to release said weight under emergency conditions.

4,587,085

NUCLEAR REACTOR SAFETY DEVICE

Ernest Hutter, Wilmette, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 15, 1983, Ser. No. 523,207
Int. Cl.[4] G21C 7/00
U.S. Cl. 376—336 12 Claims



1. In a nuclear reactor having a core, a coolant for contacting and cooling the core, at least one control rod movable axially relative to the core for varying the power output of the reactor, and control means for moving the control rod to regulate the power output,

a safety device to afford additional protection against an upward thermal excursion of the core, such safety device comprising: a laminated helical ribbon configured as a tube-like laminated helical coil having contiguous helical turns with slidably abutting edges, and means connecting such helical coil in an operative relationship between the control means and the control rod, the laminated helical ribbon having outer and inner laminae made of different materials having different thermal coefficients of expansion, the material of the outer lamina having a greater coefficient of expansion than the material of the inner lamina, the laminated helical coil being in a position to receive heat from the coolant, the helical coil being heated by an upward thermal excursion which is thereby effective to cause the helical coil to wind up to a smaller diameter, the winding up of the helical coil being operative to produce a substantial increment in the total axial length of the helical coil, whereby the increment in the length of the helical coil produces axial movement of the control rod relative to the core to reduce the power output of the reactor independently of the position of the control means.

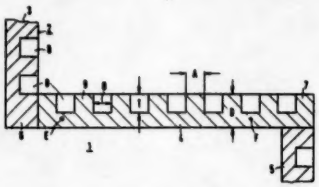
4,587,086

NUCLEAR REACTOR

Gerhard Ulrych, Erlangen, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim an der Ruhr, Fed. Rep. of Germany

Continuation of Ser. No. 362,443, Mar. 26, 1982, abandoned.
This application Dec. 18, 1984, Ser. No. 683,325
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1981, 3113587
Int. Cl.[4] G21C 13/00, 15/00
U.S. Cl. 376—399 3 Claims

1. In a nuclear reactor having a radiation-emitting core, a container enclosing the core for conducting coolant therethrough, the container comprising a plurality of individual flat metal plates formed of austenitic material and having a given thickness, said plates being disposed perpendicularly to one another at respective ends thereof so as to form container walls with corners, respectively, interior and exterior to the core, said plates forming said container walls having a plurality of parallel slots formed therein exterior to the core so as to increase the heat transfer interface area of the container and the surroundings, said slots having a depth within said plates equal



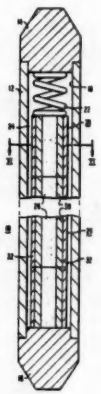
to at least one-fourth said given thickness of said plates, said slots also having a breadth which is at least as great as said depth of said slots, and being spaced from one another a distance which is at most as great as said depth thereof.

4,587,087

BURNABLE ABSORBER COATED NUCLEAR FUEL

Kenneth C. Radford, Irwin, Pa., and Beryl H. Parks, Lexington, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 22, 1983, Ser. No. 468,788
Int. Cl.[4] G21C 3/00
U.S. Cl. 376—417 10 Claims



1. A burnable absorber coated nuclear fuel comprising:

(a) a nuclear fuel substrate containing a fissionable material;

(b) a layer containing a burnable absorber covering at least a part of said substrate, said burnable absorber layer being substantially devoid of airborne moisture;

(c) an overcoated layer containing a reactor compatible, hydrophobic material generally covering, and bonded directly to, said burnable absorber layer.

4,587,088

COATING A NUCLEAR FUEL WITH A BURNABLE POISON

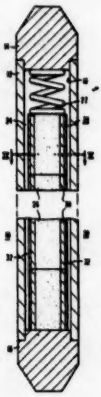
Kenneth C. Radford, Irwin, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 26, 1983, Ser. No. 526,712
Int. Cl.[4] G21C 3/00
U.S. Cl. 376—419 11 Claims

1. A method for coating a nuclear fuel with a burnable poison, comprising:

(a) cleaning at least a section of the surface of said nuclear fuel;

(b) choosing a burnable poison sputtering deposition rate that will heat the surface of said nuclear fuel to a generally steady-state temperature less than about 200° C.;



(c) sputtering, at said chosen deposition rate, a layer of said burnable poison on at least a portion of said cleaned section of said nuclear fuel; and

(d) applying heat, during sputtering, to said nuclear fuel to maintain its surface temperature between about 200° C. and about 600° C.

4,587,089

FUEL ASSEMBLY FOR BOILING WATER REACTOR

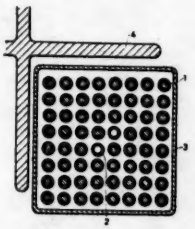
Renzo Takeda, Kawasaki; Kazuyoshi Miki, Hitachi; Yukiharu Ohga, Hitachi; Motomasa Fuse, Hitachi; Kazuo Hiramoto, Hitachi, and Motoo Aoyama, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 7, 1983, Ser. No. 464,215

Claims priority, application Japan, Feb. 8, 1982, 57-17504

Int. Cl.⁴ G21C *15/02*

U.S. Cl. 376—428 **11 Claims**



1. A fuel assembly for a boiling water reactor, having a plurality of fuel rods, said fuel rods having enriched uranium therein, said fuel rods being grouped into a bundle, said bundle being surrounded by a channel box, characterized in that in the central portion, in the axial direction, of the fuel assembly, exclusive of the upper and lower end portions, which central portion corresponds to 80% of the length, in the axial direction, of the fuel assembly, the total amount charged of (1) the total quantity of uranium and (2) plutonium is in the range of 0.28 to 0.40 kg per 175 cm^2 of the sectional area per cm of the length in the channel box.

4,587,090

FUEL ASSEMBLY FOR BOILING WATER REACTOR

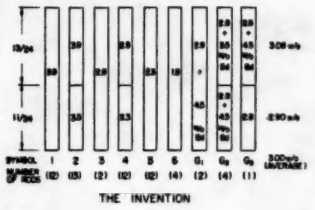
Takaaki Mochida, and Junichi Yamashita, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 4, 1983, Ser. No. 548,845

Claims priority, application Japan, Nov. 5, 1982, 57-194300

Int. Cl.⁴ G21C *3/30*

U.S. Cl. 376—428 **6 Claims**



1. A fuel assembly for loading in the core of a boiling water reactor, said fuel assembly comprising a large number of vertically extended fuel rods, some of said fuel rods containing a burnable poison, a rod-average uranium enrichment of fuel being higher in an upper region of the fuel assembly in the vertical direction than in a lower region of the fuel assembly in the vertical direction and a total content of the burnable poison being lower in the lower region of the fuel assembly than in the upper region thereof.

4,587,091

NUCLEAR FUEL ASSEMBLY

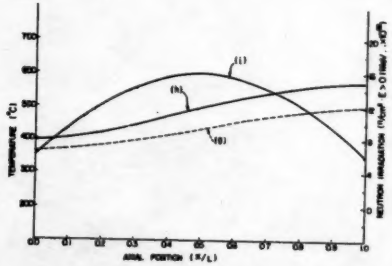
Yoshio Watari, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 2, 1982, Ser. No. 365,093

Claims priority, application Japan, Apr. 8, 1981, 56-51806

Int. Cl.⁴ G21C *3/30*

U.S. Cl. 376—434 **3 Claims**



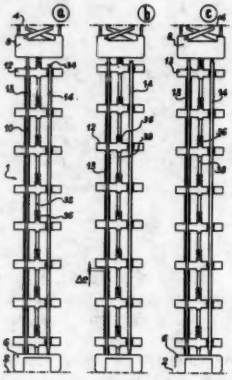
1. A fuel assembly having a wrapper tube and a plurality of fuel elements contained in said wrapper tube, each fuel element having a clad tube, characterized in that said wrapper tube is made of a material which exhibits a larger rate of swelling by neutron irradiation than the material of said clad tube, said wrapper tube being made of austenitic stainless steel, and said clad tube is made of an austentitic Ni alloy containing 30 to 80 wt % of Ni for reducing swelling by neutron irradiation to thereby utilize an alloy having a higher resistance to swelling by neutron irradiation than said austenitic stainless steel.

4,587,092

NUCLEAR REACTOR FUEL ASSEMBLY

Claude Feutrel, Vauhallan, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Continuation of Ser. No. 469,119, Feb. 23, 1983, abandoned. This application May 20, 1985, Ser. No. 735,720
Claims priority, application France, Mar. 4, 1982, 8203608
Int. Cl.[4] G21C *3/34, 3/32*
U.S. Cl. 376—438 12 Claims



1. A water-cooled nuclear reactor fuel assembly comprising:

upper and lower end pieces;

connecting rods extending between said upper and lower end pieces, the ends of each connecting rod being fixed to the respective end piece;

fuel rod spacing grids slidably fitted on and distrubuted along said connecting rods, said spacing grids having apertures through which said connecting rods pass and having fuel rod apertures, said spacing grids being formed entirely of a zirconium alloy of low neutron absorption cross section;

spacers extending between said fuel rod spacing grids for establishing a minimum spacing between adjacent fuel rod spacing grids;

fuel rods extending slidably through the fuel rod apertures in said spacing grids, the fuel rod apertures having bearing members for at least initially securing said fuel rods to said spacing grids such that during operation said spacing grids at least initially follow longitudinal expension of said fuel rods;

means for joining one end of each of said fuel rods to one of said end pieces; and

at least one spring for urging said spacing grids and spacers towards one of said end pieces for ultimate abutment against said one of said end pieces, said spring being located in a position between said upper and lower end pieces.

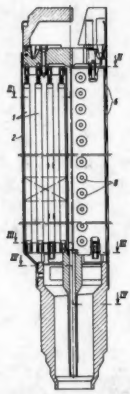
4,587,093

NUCLEAR FUEL ASSEMBLY

Bo Borrman, and Olov Nylund, both of Västerås, Sweden, assignors to AB Asea-Atom, Västerås, Sweden

Filed Jun. 28, 1983, Ser. No. 508,681
Claims priority, application Sweden, Jul. 12, 1982, 8204270
Int. Cl.[4] G21C *3/32, 15/02*
U.S. Cl. 376—444 6 Claims

1. A fuel assembly for a boiling water nuclear reactor, said fuel assembly comprising a plurality of fuel rods surrounded by a fuel channel separate from said fuel rods, said fuel channel being of substantially rectangular cross-section; an elongated stiffening device surrounded by said fuel channel, said stiffening device being separate from said fuel rods and extending along a greater part of the length of said fuel rods, the vertical center line of said stiffening device lying in the vicinity of the vertical center line of said fuel channel, said stiffening device having four stiffening wings arranged in vertical planes and having angular distances of about 90° between themselves, said stiffening wings being connected to each other and to corresponding sidewalls of said fuel channel to prevent said fuel channel from deforming outwardly during reactor operation, said wings constituting partitions between four bundles of fuel rods and each of said wings having at least one vertical internal water passageway extending along a greater part of the length of said fuel rods such that water flowing upward through said internal water passageway is prevented from contacting said fuel rods so as to minimize the void content of the water in said internal water passageway and maximize its moderator effect; and a plurality of transverse channels for hydraulic communication between adjacent fuel rod bundles arranged one above the other along at least one of said wings in the vicinity of a corresponding sidewall of said fuel channel, said sidewall



having a plurality of projections stamped in said sidewall one above the other in vertically spaced relationship along a vertically extending mid-portion of said sidewall such that a vertical section through said mid-portion follows a wavy line, each of said stamped projections having a radially inwardly facing convex side and a radially outwardly facing concave side and each of said stiffening wings comprising two vertical sheet portions arranged to define part of said internal water passageway therebetween and having a straight vertical edge portion in which said sheet portions are united by welding, said edge portion extending along a greater part of the vertical extent of said fuel channel and being welded directly to said stamped projections by means of a linear, vertically extending welded zone disposed along a portion of each of said projections at said concave side, each of said transverse hydraulic channels being defined by means of a planar wall portion existing between a pair of adjacent stamped projections, by means of an inwardly facing surface portion of each of said adjacent projections, and by means of a portion of said straight vertical edge portion.

4,587,094

FUEL ROD ASSEMBLY FOR A NUCLEAR REACTOR

George D. Bucher, Allison Park, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 27, 1984, Ser. No. 584,229
Int. Cl.[4] G21C *3/10*
U.S. Cl. 376—451 9 Claims

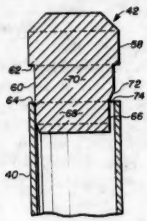
1. A fuel rod assembly for a nuclear reactor, said fuel rod assembly including a longitudinally extending tubular cladding member having an inner wall, nuclear fuel and a gas under

pressure disposed within said member, and end plugs at opposite ends of said member for sealing the fuel and the pressurized gas within said member wherein at least one of said end plugs comprises:

(a) an upper shoulder portion of a diameter greater than the inner diameter of said tubular member for abutment with the end of said tubular member; and

(b) a lower circular body portion integral with said upper shoulder portion and adapted to be inserted into the end of said tubular member in a force fitting relationship, said lower body portion including an outer part adjacent said upper shoulder portion and an inner part adjacent the interior of said tubular member;

(c) said inner part of said lower body portion having a flat defined thereon which extends from a top edge of said flat



to a bottom edge of said inner part of said end plug lower body portion and generally parallel to the longitudinal extent of said tubular cladding member, and a transition surface which extends from said upper edge of said flat to a lower edge of said outer part of said end plug lower body portion and is slanted away from the longitudinal extent of said tubular cladding member, such that upon partial insertion of said lower body portion into said tubular member, said flat defines a gap between the inner wall of said tubular member and said lower body portion so as to provide an orifice for introducing a gas under pressure into said tubular member whereas upon total insertion of said lower body portion, said gap is eliminated and metal-to-metal sealing contact is made between said lower portion of said plug and said one end of said tubular member.

4,587,095

SUPER HEATRESISTANT CERMET AND PROCESS OF PRODUCING THE SAME

Hironori Yoshimura; Naohisa Ito, both of Tokyo; Kenichi Nishigaki, and Katsunori Anzai, both of Omiya, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 12, 1984, Ser. No. 570,282

Claims priority, application Japan, Jan. 13, 1983, 58-3687; Mar. 23, 1983, 58-48498

Int. Cl.⁴ C22C *29/04, 29/12;* B22F *3/16, 3/24*

U.S. Cl. 419—13 **20 Claims**

1. A super heat resistant cermet consisting essentially of about 10 to about 65% by weight of a solid solution carbonitride containing titanium and tungsten, about 0.01 to about 1.0% by weight of magnesium oxide, and not more than about 1% by weight of inevitable impurities, balance tungsten.

9. A blade member for cutting tools, formed from the cermet as recited in claim 1 wherein the blade member is coated with at least one layer composed of one substance selected from the group consisting of an oxide and an oxynitride of aluminum; a carbide, a nitride, a carbonitride and an oxycarbonitride of titanium; a carbide, a nitride, a carbonitride and an oxycarbonitride of zirconium; and a carbide, a nitride, a carbonitride and an oxycarbonitride of hafnium.

4,587,096

CANLESS METHOD FOR HOT WORKING GAS ATOMIZED POWDERS

William L. Mankins; Lindy J. Curtis, and Gene A. Stewart, all of Huntington, W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.

Filed May 23, 1985, Ser. No. 737,278

Int. Cl.⁴ B22F *3/26*

U.S. Cl. 419—27 **11 Claims**

1. A canless method for hot working a gas atomized alloy powder having nickel as a major component, the method comprising blending the alloy powder with additional nickel powder, consolidating the resultant powder into a form, sintering the form in a first non-oxidizing environment for a time necessary to achieve sufficient green strength for subsequent handling, sealing the surface of the form to deny oxygen access therein, heating the sealed form to the hot working temperature in a second non-oxidizing environment, and hot working the form.

4,587,097

HOMOGENEOUS LOW MELTING TEMPERATURE BRAZING FILLER METAL FOR JOINING FERROUS AND NON-FERROUS ALLOYS

Anatol Rabinkin, Morris Plains, and Amitava Datta, Morris Township, Morris County, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jun. 22, 1984, Ser. No. 623,686

Int. Cl.⁴ C22C *9/05*

U.S. Cl. 420—473 **21 Claims**

1. A homogeneous, ductile metal alloy having a metastable structure and a composition consisting essentially of about 4 to 16 atom percent manganese, about 4 to 16 atom percent silicon, about 0 to 16 atom percent tin, about 0 to 20 atom percent zinc, about 0 to 10 atom percent silver and about 0 to 10 atom percent indium, the balance being copper and incidental impurities.

4,587,098

METHOD OF STABILIZED OPERATION OF ACID DIGESTION KETTLE OF TANTALUM

Katsuyuki Ohtsuka; Ryukichi Mizuno; Hitoshi Miyazaki, all of Tokai; Toshio Fukuzuka; Kazutoshi Shimogori, both of Kobe; Hiroshi Satoh, Suita, and Fumio Kami Kubo, Kobe, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo and Kabushiki Kaisha Kobe Seiko Sho, Kobe, both of, Japan

Filed May 18, 1981, Ser. No. 264,406

Claims priority, application Japan, May 16, 1980, 55-65788

Int. Cl.⁴ C23F *11/04, 11/18*

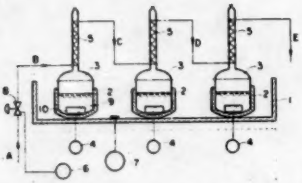
U.S. Cl. 422—7 **4 Claims**

1. A method of maintaining the concentration of an anti-corrosion and anti-embrittlement agent in an acid digestion process above an effective level on the order of 10 ppm, said acid digesting process comprising the steps of:

(a) placing a high temperature, high concentration sulfuric acid in an environment at least one of the boundaries of which is defined by structure composed of tantalum or a tantalum-based alloy;

(b) placing organic waste matter in said environment for decomposition of the organic waste matter by the high temperature, high concentration sulfuric acid; and

(c) adding on the order of 10 ppm of an anti-corrosion and anti-embrittlement agent selected from the group consisting of nitric acid, nitrous acid, nitrates, nitrite, nitrogen oxide, and combinations thereof to the sulfuric acid during the decomposition of the waste matter to minimize corrosion deterioration and hydrogen absorption embrittlement of the tantalum or tantalum-based alloy,



said method of maintaining the concentration of the anti-corrosion and anti-embrittlement agent comprising the steps of:

(d) measuring the self-potential of said structure while the organic waste matter is being digested and,

(e) when the self-potential has decreased to on the order of +0.2 V, adding more of the anti-corrosion and anti-embrittlement agent so as to maintain the self-potential at not less than +0.2 V.

4,587,099

TEST STRIPS FOR THE DETECTION OF A LIQUID SAMPLE COMPONENT

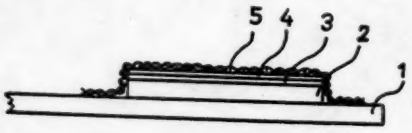
Anselm Rothe; Adolf K. Selle, both of Birkenau, and Bernward Sojka, Viernheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Continuation of Ser. No. 372,416, Apr. 27, 1982, abandoned. This application Dec. 5, 1984, Ser. No. 677,899

Claims priority, application Fed. Rep. of Germany, May 9, 1981, 3118381

Int. Cl.⁴ G01N *21/78, 33/52*

U.S. Cl. 422—56 **10 Claims**



1. A multi-layered test strip for detecting a component of a liquid sample, comprising: a carrier; a slowly-absorbent layer on the carrier for slowly sucking up a liquid sample; reagent layer means comprising an absorbent reagent-containing layer on the slowly-absorbent layer opposite the carrier for absorbing sufficient of the liquid sample when dipped therein for the reagent contained therein to react with the liquid sample and detect thereby the component of the liquid sample; and a mesh conductive of the liquid sample, covering the layers, sufficiently contiguous to the slowly-absorbent layer for fluid communication therewith, and fixed to the carrier, the absorbent reagent-containing layer comprising a absorbent polymeric film layer in which the reagent is embedded and means for liquid-impermeably preventing passage of the liquid sample therethrough to the slowly-absorbent layer.

4,587,100

MULTILAYER ANALYTICAL ELEMENT FOR THE DETECTION OF HYDROGEN PEROXIDE

Yoshikazu Amano; Fuminori Arai, and Masao Kitajima, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 8, 1983, Ser. No. 530,207

Claims priority, application Japan, Sep. 10, 1982, 57-157442

Int. Cl.⁴ G01N *21/78, 31/22*; C12Q *1/00*

U.S. Cl. 422—56 **9 Claims**

1. In a multilayer analytical element comprising a water-impermeable, light-transmissive support, a reagent layer containing at least a peroxidase, and a porous spreading layer, which are superposed in this order, the improvement which comprises at least one layer other than said support containing a water-soluble monocarboxylic acid or a salt thereof having solubility of not less than 1 g. in 100 g. of water at 25° C.

4,587,101

MEASURING DEVICE FOR DETERMINING THE O_2 CONTENT OF A SAMPLE

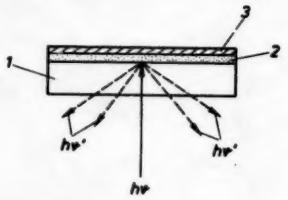
Hermann Marsoner, and Herbert Kroneis, both of Graz, Austria, assignors to AVL AG, Schaffhausen, Switzerland

Filed Nov. 18, 1983, Ser. No. 553,386

Claims priority, application Austria, Nov. 22, 1982, 4248/82

Int. Cl.⁴ G01N *1/48, 21/06*

U.S. Cl. 422—56 **15 Claims**



1. A sensor element which, when placed in contact with a sample containing oxygen, is capable of indicating the oxygen content in said sample, said sensor element comprising a carrier which is composed of a linear and amorphous polymer which is compatible with plasticizers, said polymer carrier being permeable to oxygen molecules; a plasticizer compound contained within said polymer carrier; and an oxygen-sensitive fluorescent indicator substance selected from the group consisting of polycyclic aromatic molecules, homocyclic aromatic molecules and heterocyclic aromatic molecules contained within said polymer carrier, said oxygen-sensitive fluorescent indicator substance upon excitation emitting light of a certain wavelength and of varying intensity depending on the amount of oxygen from said sample in contact therewith.

4,587,102

MULTI-LAYER ANALYSIS ELEMENT UTILIZING SPECIFIC BINDING REACTION

Shigeru Nagatomo; Yukio Yasuda; Nobuhito Masuda; Hajime Makiuchi, and Masaki Okazaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 446,110, Dec. 2, 1982, abandoned, which is a continuation-in-part of Ser. No. 361,022, Mar. 23, 1982, abandoned, which is a continuation-in-part of Ser. No. 311,806, Oct. 15, 1981, abandoned. This application Aug. 2, 1984, Ser. No. 637,324

Claims priority, application Japan, Jun. 5, 1981, 56-86655

Int. Cl.⁴ G01N *21/78, 33/53*

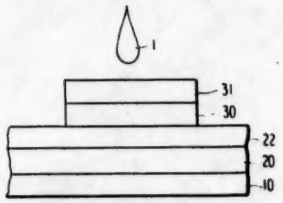
U.S. Cl. 422—56 **12 Claims**

1. A multilayer analysis element for assaying a concentraion of a specific component in an aqueous medium utilizing a competitive reaction in the presence of a predetermined

amount of a protein to be specifically bound to a specific component and a specific component labeled with a labeling substance which is capable of reacting with said protein to be specifically bound to said specific component,

the multilayer analysis element comprising:

(A) a reaction element comprising a fibrous porous medium having a water-retention capability of at least 25 μl and fine particles of a high molecular weight material having a particle size of about 1 μm to about 1 mm which contains a protein to be specifically bound to a specific component to be assayed but does not substantially contain any specific component having binding capability to the protein, whereby when a sample solution is applied to said reaction element it is absorbed and retained in said reaction element for a time period sufficient for a competitive reaction to occur in the reaction element; and having further provided in fluid communication with said reaction element,



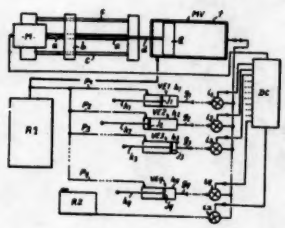
(B) a detection element comprising a detection layer which receives a labeled specific component unbound to said protein as a result of said competitive reaction or an optically detectable signal formed dependent on the amount of said labeled specific component.

4,587,103

DEVICE FOR ACTUATING AN AUTOMATIC DEVICE COMPRISING A PLURALITY OF COMBINED MOBILE MEMBERS

Alain C. A. Benajam, Bobigny, and Jean-Michel Lachenal, Fresnes, both of France, assignors to Le Materiel Biomedical, Paris, France

Filed Oct. 4, 1984, Ser. No. 657,530
Int. Cl.⁴ G01N *33/00*
U.S. Cl. 422—67 **5 Claims**



1. A device for actuating an automatic device comprising a plurality of combined mobile members, comprising:

(a) a single electric motor capable of rotating in both directions of rotation;

(b) mechanical means for converting the movement of rotation of said electric motor into a movement of translation;

(c) a hydraulic master jack whose piston is controlled in translation by said movement converting means;

(d) a plurality of hydraulic ducts connected in parallel to the cylinder of said master jack;

(e) a plurality of electro-valves each mounted on one of said hydraulic ducts;

(f) a device for controlling said electro-valves;

(g) a plurality of hydraulic slave jacks whose cylinders are each connected to one of said hydraulic ducts and whose pistons are each connected to one of said mobile members; and

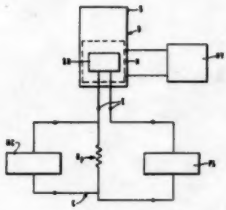
(h) a source of pressurized fluid permanently connected via a plurality of lines to the cylinders of the slave jacks, on the piston side thereof opposite the connecting ducts of the master jack.

4,587,104

SEMICONDUCTOR OXIDE GAS COMBUSTIBLES SENSOR

Lymperios N. Yannopoulos, Churchill Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 21, 1983, Ser. No. 564,051
Int. Cl.⁴ G01N *27/16*
U.S. Cl. 422—94 **3 Claims**



1. A semiconductor oxide thick film fuel constituent detecting device responsive to the reaction of fuel and oxygen constituents in a monitored gas environment by exhibiting a change in electrical resistivity, which change is monitored as an indication of the fuel, or reducing, element in the monitored gas environment, comprising:

a non-conducting substrate member having upper and lower surfaces;

a pair of spaced-apart electrodes disposed on said substrate member;

a thick film semiconductor oxide element consisting of bismuth molybdate disposed in intimate contact with one of said surfaces of said substrate member and in intimate contact with said electrodes;

a film heater member disposed in intimate contact with the other of said surfaces of said substrate member

electrical excitation means connected to said film heater means to heat said thick film element within a predetermined heating range; and

circuit means for monitoring changes in resistivity of said thick film element in response to reactions of said fuel and oxygen constituents at the surface of said thick film element as an indication of the fuel constituent of the gas environment contacting said thick film element.

4,587,105

INTEGRATABLE OXYGEN SENSOR

Ulrich Bonne, Hopkins, and Robert G. Johnson, Minnetonka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

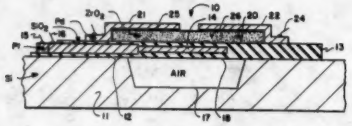
Filed May 17, 1984, Ser. No. 611,306
Int. Cl.⁴ G01N *27/12, 27/46*
U.S. Cl. 422—98 **16 Claims**

1. An oxygen sensor comprising:

a semiconductor substrate body with a depression therein;

a dielectric thin film on said body and bridging said depression;

a thin film heater embedded within the dielectric film bridge;
a ZrO_2 film over said dielectric film bridge; and,



first and second conductive films spaced apart one from the other on the surface of said ZrO_2 film which is away from the dielectric film.

4,587,106

LIQUID-LIQUID EXTRACTION WITH THE AID OF MICROEMULSIONS OF SUBSTANCES DISSOLVED IN WATER

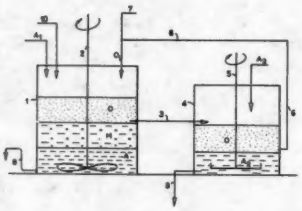
Denise Bauer, Le Raincy; Jacques Komornicki, Lescar, and Jacques Tellier, Billere, all of France, assignors to Societe Nationale Elf Aquitaine, France

Filed Dec. 23, 1982, Ser. No. 452,708

Claims priority, application France, Dec. 28, 1981, 81 24267

Int. Cl.⁴ B01D *11/00, 17/02*

U.S. Cl. 423—8 **16 Claims**



1. Process of liquid-liquid extraction of a substance from an aqueous solution comprising the steps of

(a) contacting the aqueous solution, a hydrophobic liqud, an extractant compound capable of forming with the substance to be extracted a combination soluble in the hydrophobic liquid, a surfactant and a co-surfactant so as to form a product having three distinct layers, said layers being the aqueous solution, the hydrophobic liquid and a layer of a microemulsion between the layers of the aqueous solution and hydrophobic liquid;

(b) separating the aqueous layer;

(c) separating the hydrophobic layer and recovering the substance desired therefrom;

(d) combining the microemulsion layer with additional hydrophobic liquid, extractant, surfactant and co-surfactant of the amount lost during the steps separating the aqueous liquid and hydrophobic liquid from the three-layer product;

(e) contacting a new quantity of aqueous solution containing the substance to be extracted with the microemulsion-hydrophobic liquid combination so as to form a new three-layer product;

(f) separating the aqueous layer from the new three-layer product; and

(g) separating the hydrophobic liquid from the microemulsion and recovering the substance desired therefrom.

4,587,107

EXTRACTANT COMPOSITIONS CONTAINING DIALKYL AND DIARYL PHOSPHONATE DERIVATIVES AND METHODS FOR THE USE THEREOF

Jaime Wisniak, Beer-Sheva, Israel, assignor to Negev Jojoba, Tel Aviv, Israel

Filed Sep. 21, 1983, Ser. No. 534,281

Claims priority, application Israel, Dec. 3, 1982, 67404

Int. Cl.⁴ C01G *43/00*

U.S. Cl. 423—10 **10 Claims**

1. A method for extracting actinide metal ions from an aqueous solution containing the same comprising contacting said solution with an extractant organic solution comprising, as an extraction agent, the reaction product of jojoba oil and dialkyl or diaryl phosphite, and separating the resulting phases.

4,587,108

FLOCCULATION OF ACID LEACH SLURRIES

Alister R. F. MacDonald, Rand Park Ridge, South Africa, assignor to Allied Colloids Limited, England

Filed Oct. 3, 1983, Ser. No. 538,703

Claims priority, application United Kingdom, Oct. 7, 1982, 8228755

Int. Cl.⁴ C01G *56/00, 57/00*

U.S. Cl. 423—11 **12 Claims**

1. A process in which insoluble material is separated from an acid-leached uranium slurry in the presence of an effective amount of a flocculating agent that improves the rate of separation and in which the flocculating agent comprises a combination of polyacrylamide and a copolymer of acrylamide with 10 to 90% by weight 2-acrylamide-2-methylpropanesulphonic acid or a water soluble salt thereof (AMS) and in which the copolymer is present in amount of 20 to 85% by weight of the combination and that is such that the rate of separation is greater than the rate of separation that is obtained using either component alone in an amount equal to the amount of the combination.

4,587,109

PROCESS FOR THE SEPARATE RECOVERY OF MOLYBDENUM AND VANADIUM

Georges Lyaudet, and Jean Vial, both of Limoges, France, assignors to Compagnie Generale des Matieres Nucleaires (COGEMA), France

Continuation of Ser. No. 306,723, Sep. 29, 1981, abandoned. This application Jul. 8, 1983, Ser. No. 512,005

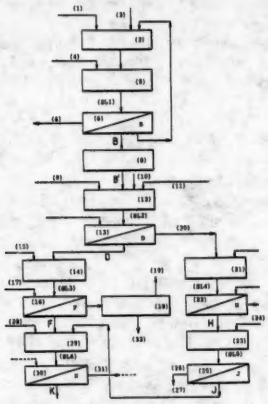
Claims priority, application France, Oct. 3, 1980, 80 21288

Int. Cl.⁴ C01G *43/00, 39/02, 31/02*

U.S. Cl. 423—15 **28 Claims**

27. Process for separating and purifying molybdenum from an initial solution containing molybdenum, vanadium and phosphorous in the form of their metal salts and being derived from a solid-liquid mixture, the amount of molybdenum being greater than 5 moles of molybdenum for 1 mole of vanadium, comprising adding to the solid-liquid mixture an alkaline carbonate capable of solubilizing the molybdenum, phosphorous, vanadium and uranium, adjusting the value of the pH to about 12.5–13.5 by the addition of a base to precipitate solid uranate while the molybdenum, vanadium and phosphorous remain in the liquid phase, separating the solid and liquid phases to obtain a solid phase containing the uranium and a liquid phase containing the molybdenum, vanadium and phosphorous, adjusting the pH of the liquid phase to about 11, adding excesses of an ammonium salt and a magnesium salt to said liquid phase, the respective amounts of ammonium and of magnesium salts being sufficient to precipitate the whole of the phosphorous and vanadium respectively, as solid salts of ammoniacomagnesium phosphate and of amonium vanadate, with the proviso that the concentration of any reacted amonium salt present after precipitation of the amonium vanadate be insufficient to

cause precipitation of molybdenum from said solution, and separating the resulting liquid phase containing the molybdenum from the resulting solid phase containing the vanadium and phosphorus.



4,587,110

PROCESS OF RECOVERING COPPER AND OF OPTIONALLY RECOVERING SILVER AND GOLD BY A LEACHING OF OXIDE- AND SULFIDE-CONTAINING MATERIALS WITH WATER-SOLUBLE CYANIDES

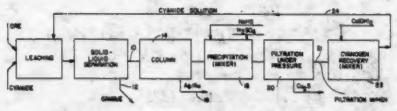
George M. Potter, Tucson, Ariz.; Arthur Bergmann, and Ulrich Haidlen, both of Lennestadt, Fed. Rep. of Germany, assignors to MNR Reprossesing, Inc., Toronto, Canada

Filed Aug. 8, 1984, Ser. No. 639,370

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1983, 3330795

Int. Cl.[4] C01G *3/12*

U.S. Cl. 423—30 8 Claims



1. A process for recovering copper from sulfide- and oxide-containing ores, concentrates, residual waste products and slags in particulate form which contains copper, comprising treating the particulate with an aqueous solution of an alkali cyanide or alkaline earth cyanide to produce a cyanide laden solution; adding a water-soluble sulfide compound to the laden solution; adjusting the solution pH to 1.5 to 2.0 by an addition of acid to effect precipitation of metal sulfide under superatmospheric pressure; filtering off under superatmospheric pressure the precipitated metal sulfide to produce a filtrate containing hydrocyanic acid; and recovering the hydrocyanic acid under superatmospheric pressure by reaction of said filtrate with an alkaline substance; the said superatmospheric pressure in said steps being 1.5 to 15 bars at ambient (room) temperature.

4,587,111

METHOD OF LIQUID-LIQUID EXTRACTION OF GALLIUM FROM A BASIC AQUEOUS SOLUTION

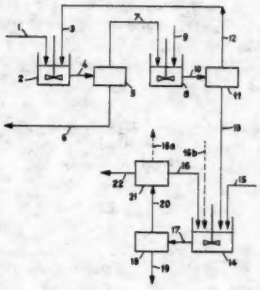
Nicholas P. Wynn, Toronto, Canada, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Nov. 7, 1984, Ser. No. 669,065

Claims priority, application Switzerland, Nov. 17, 1983, 6178/83

Int. Cl.[4] C01G *15/00*

U.S. Cl. 423—112 10 Claims



1. A method for liquid-liquid extraction of gallium from a basic aqueous solution, said method comprising the steps of

contacting a sodium aluminate solution with an organic extractant containing a diluent and a substituted hydroxyquinoline to obtain a gallium and aluminum loaded organic extractant solution;

thereafter bringing said loaded extractant solution into contact with concentrated aqueous mineral acid to strip gallium and aluminum from the extractant;

separating an aqueous acidic solution of gallium and aluminum from the depleted extractant solution;

then increasing the chloride content of the aqueous acidic solution of gallium and aluminum to a concentration of more than 2 mols per liter;

contacting the aqueous solution with an organic solvent selected from the group consisting of ethyl ethers containing between 2 and 16 carbon atoms or alkyl acetates containing less than 10 carbon atoms to pass gallium chloride into the organic solvent while aluminum remains in the concentrated aqueous mineral acid;

thereafter separating the aqueous acidic solution of aluminum from the gallium chloride loaded solvent, and

then separating the organic solvent from the gallium chloride whereby the separated gallium chloride is available as a feed for producing pure gallium.

4,587,112

EFFLUENT GAS DESULFURIZATION WITH CONVERSION TO GYPSUM OF LARGE PARTICLE SIZE

Bang M. Kim, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 20, 1985, Ser. No. 746,810

Int. Cl.[4] C01B *17/00*; C01F *11/46*; G01N *33/00*

U.S. Cl. 423—242 13 Claims

1. A method for removing sulfur dioxide from effluent gas which comprises contacting said gas with a slurry initially consisting essentially of water, at least one calcium compound selected from the group consisting of calcium oxide, calcium hydroxide and calcium carbonate and at least one oxidizing agent selected from the group consisting of oxygen and hydrogen peroxide, in amounts to convert said sulfur dioxide to calcium sulfate, and analyzing said slurry for content of said oxidizing agent so as to promotoe conversion of said sulfur dioxide to calcium sulfate of maximum crystal size.

4,587,113

REMOVAL OF SULFUR AND NITROGEN CONTAINING POLLUTANTS FROM DISCHARGE GASES

James I. Joubert, Pittsburgh, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 8, 1985, Ser. No. 699,889
Int. Cl.[4] B01J 8/00; C01B 17/00, 21/00
U.S. Cl. 423—244 13 Claims

1. A process for the removal of sulfur oxide-containing pollutants from a gas flow including entrained ash comprising:

entraining finely divided, unsupported oxide of copper powder in said gas flow to react with the sulfur oxide containing pollutants and form a sulfate of copper in mixture within the powder, said finely divided oxide of copper powder having an average particle size of less than 30 microns;

separating said powder and ash from said gas;

contacting said powder and ash with oxide of sulfur gas to sulfate substantially all of the oxide of copper in said powder;

contacting said sulfated powder and ash with aqueous solvent to dissolve said sulfate of copper into solution while ash remains as solid;

separating the liquid solution containing sulfate of copper from the solid ash;

spray drying said liquid solution to form fine particles including a sulfate of copper;

heating the sulfate of copper particles to a sufficient temperature to decompose said sulfate of copper to a finely divided oxide of copper powder and an oxide of sulfur gas;

returning said finely divided oxide of copper powder into contact with said gas flow; and

recycling a portion of said oxide of sulfur gas into contact with ssid powder and ash.

4,587,114

METHOD FOR SEPARATING CARBON DIOXIDE FROM MIXED GAS

Hidefumi Hirai, 14-10, 1-Chome, Yutenji, Meguro-Ku, Tokyo, Japan; Makoto Komiyama, and Keiichiro Wada, both of Tokyo, Japan, assignors to Hidefumi Hirai, Tokyo, Japan

Filed Mar. 14, 1983, Ser. No. 475,258
Claims priority, application Japan, Mar. 13, 1982, 57-40014; Oct. 9, 1982, 57-177859; Dec. 7, 1982, 57-214329; Jan. 27, 1983, 58-11739
Int. Cl.[4] B01J 21/18
U.S. Cl. 423—247 6 Claims

1. A method for removing carbon monoxide from mixed gas comprising:

contacting the mixed gas with a solid carbon monoxide adsorbent in a container to adsorb the carbon monoxide from the mixed gas, said carbon monoxide adsorbent obtained by:

adding a copper compound to a solvent;

stirring the copper compound and solvent;

adding active carbon to the stirred copper compound and solvent;

stirring the active carbon, copper compound and solvent; and

removing solvent; and

releasing carbon monoxide adsorbed by the adsorbent.

4,587,115

PROCESS FOR PREPARATION OF HIGH-SILICA FAUJASITE TYPE ZEOLITE

Junji Arika, Tokuyama; Michiyuki Aimoto, Kudamatsu, and Hiroshi Miyazaki, Shinnanyo, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

Filed Jun. 8, 1984, Ser. No. 618,945
Claims priority, application Japan, Jun. 9, 1983, 58-101708
Int. Cl.[4] C01B 33/28
U.S. Cl. 423—329 15 Claims

1. A process for the preparation of a high-silica faujasite type zeolite having a silica/alumina ratio of at least 4.5, which process comprises the steps of:

(a) simultaneously and continuously supplying an aqueous solution of an alkali metal silicate and an aqueous solution of an aluminum-containing compound into a reaction zone whereby the alkali metal silicate is continuously reacted with the aluminum-containing compound to prepare a homogeneous phase compound of a granular amorphous aluminosilicate containing, based on the anhydride, 10 to 16% by weight as Al_2O_3, of aluminum, about 74.52 to about 83.67% by weight, as SiO_2, of silica and about 6.17 to about 9.63% by weight, calculated in terms of Na_2O, of alkali metal, said granular homogeneous phase amorphous aluminosilicate prepared in the reaction zone in the form of an aqueous slurry having a pH value of 5 to 9;

(b) subjecting the aqueous slurry of the granular homogeneous phase amorphous aluminosilicate to solid-liquid separation;

(c) aging a part of the granular homogeneous phase amorphous aluminosilicate thus separated in an aqueous alkali metal hydroxide solution at a temperature of 10° to 95° C. for 0.5 to 12 hours; and then

(d) crystallizing a mixture of the aged granular homogeneous phase amorphous aluminosilicate and the nonaged granular homogeneous phase amorphous aluminosilicate in an aqueous alkali metal hydroxide solution having a concentration of 4 to 10% by weight.

4,587,116

PROCESS FOR TREATING CHLORINATED NITROGEN-CONTAINING HYDROCARBONS

Dana A. Livingston, Pittsburg, and Joseph P. Surls, Jr., Walnut Creek, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 6, 1984, Ser. No. 577,441
Int. Cl.[4] C01B 31/18, 31/20
U.S. Cl. 423—415 A 15 Claims

1. A process for using a chlorinated, nitrogen-containing hydrocarbon to produce a metal chloride or metal oxychloride comprising the step of:

contacting at reactive conditions at least one chlorinated, nitrogen-containing hydrocarbon of the formula $C_aH_bCl_cN_dBr_eO_f$, wherein "a", "c" and "d" are each independently integers greater than 0, and "b", "e" and "f" are each independently integers equal to at least 0, with a sufficient quantity of a suitable refractory metal oxide and a sufficiently quantity of chlorine or a mixture of chlorine and oxygen to convert essentially all of the carbon atoms of the chlorinated hydrocarbon to carbon monoxide or carbon dioxide.

4,587,117

MEDICAL DEVICE FOR DELIVERING DRUG TO PH ENVIRONMENTS GREATER THAN 3.5

David Edgren, El Granada; Patrick S. L. Wong, Hayward, and Felix Theeuwes, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 501,573, Jun. 6, 1983, Pat. No. 4,503,036. This application Jan. 22, 1985, Ser. No. 693,649
The portion of the term of this patent subsequent to Mar. 5, 2002, has been disclaimed.
Int. Cl.[4] A61K *9/32, 9/36*
U.S. Cl. 424—15 3 Claims

1. A medical device for delivering a beneficial drug to a biological environment of use having a pH of 3.5 to 8.0, said medical device comprising:

(a) a shaped wall comprising a first means for forming the wall, said first means permeable to the passage of an exterior fluid, substantially impermeable to the passage of drug and pH insensitive at a pH of from 0 to 8; said shaped wall additionally comprising a second and different means that is pH sensitive in a pH of from 3.5 to 8.0 and present in an effective amount for causing the shaped wall to lose its integrity in said pH from 3.5 to 8.0, said shaped wall initially surrounding and forming:

(b) a compartment containing a dosage unit amount of a beneficial intestinal administrable drug;

(c) at least one passageway through the wall connecting the compartment with the exterior of the medical device; and,

(d) wherein, when the medical device is in an environment having a pH from 3.5 to 8.0, the second means loses its integrity thereby causing the medical device to self-destruct and release its beneficial drug in the environment having the pH from 3.5 to 8.0.

4,587,118

DRY SUSTAINED RELEASE THEOPHYLLINE ORAL FORMULATION

Chiin H. Hsiao, Cooper City, Fla., assignor to Key Pharmaceuticals, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 592,935, Mar. 23, 1984, which is a continuation-in-part of Ser. No. 372,300, Apr. 27, 1982, abandoned, which is a continuation of Ser. No. 283,446, Jul. 17, 1981, abandoned. This application Dec. 12, 1984, Ser. No. 680,703
Int. Cl.[4] A61K *9/52, 9/58, 9/62*
U.S. Cl. 424—19 7 Claims

1. A sustained release dosage formulation of theophylline which includes an easily openable capsule having therein a plurality of micropellets, the sum of such micropellets in said capsule forming a dosage unit of theophylline, each of said micropellets being based upon a seed having coated thereon a first coating mixture of theophylline and polyvinylpyrrolidone, characterized in that the thus coated seed has further coated thereon a second coating mixture of about 90–70% by weight of ethylcellulose and about 10–30% by weight of hydroxypropylcellulose.

4,587,119

METHOD OF REDUCING DENTAL PLAQUE FORMATION WITH PRODUCTS FOR HUMAN OR ANIMAL CONSUMPTION USING ISOMALTULOSE SUCROSE SUBSTITUTE

Christopher Bucke, and Peter S. J. Cheetham, both of Reading, England, assignors to Tate & Lyle Public Limited Company, England

Continuation of Ser. No. 391,498, Jun. 24, 1982, abandoned, which is a continuation-in-part of Ser. No. 201,463, Oct. 28, 1980, abandoned. This application Dec. 14, 1984, Ser. No. 682,567
Claims priority, application United Kingdom, Nov. 7, 1979, 7938562
Int. Cl.[4] A61K *31/70, 9/68;* A23G *3/00, 3/30*
U.S. Cl. 424—48 2 Claims

1. In a method for reducing dental plaque formation in the oral cavity caused by *Streptococcus mutans* in combination with a nonalcoholic, sucrose-containing product for human or animal consumption, the improvement which comprises substituting isomaltulose for at least a portion of the sucrose in said product, thereby reducing the formation of the dental plaque.

4,587,120

ORAL COMPOSITION AND ABRASIVE THEREFOR

Toshiyuki Ozawa, Chigasaki; Osamu Uotani, Chiba, and Rieko Hayashi, Odawara, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed Dec. 29, 1983, Ser. No. 566,681
Claims priority, application Japan, Dec. 29, 1982, 57-228601; Dec. 29, 1982, 57-228602
Int. Cl.[4] A61K *7/16*
U.S. Cl. 424—57 16 Claims

1. A dentifrice composition comprising an abrasive consisting of calcium hydrogenphosphate anhydride whose crystallite has an average size of 300 to 3,500 angstroms as measured by X-ray diffractometry.

4,587,121

HIGH TITER PSEUDOMONAS IMMUNE SERUM GLOBULIN

Michael S. Collins, Richmond, and Robert E. Roby, Pinole, both of Calif., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Jun. 17, 1983, Ser. No. 504,106
Int. Cl.[4] A61K *39/395, 39/40;* C07K *15/00, 3/00*
U.S. Cl. 424—87 12 Claims

1. A method for preparing an immune serum globulin having a high titer of antibody to lipopolysaccharide antigens of *P. aeruginosa* of Fisher immunotypes 1–7 which comprises:

(a) screening plasma from donors who have not been vaccinated with a Pseudomonas vaccine or had a recent Pseudomonas infection for a titer of unattenuated antibody to lipopolysaccharide of *P. aeruginosa* of Fisher immunotypes 1, 2, 4, and 6 which is 1:1600 or greater,

(b) pooling plasma of said titer of antibody, and

(c) preparing an immune serum globulin from said pooled plasma.

8. An immune serum globulin having a titer of antibody to lipopolysaccharide antigens of *P. aeruginosa* of Fisher immunotypes 1, 2, 4, and 6 of at least 1:6400 produced by the method of claim 1.

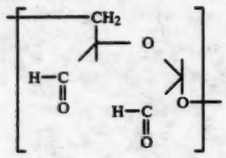
4,587,122

FIBRONECTIN-DEXTRAN-DRUG COMPLEX AND METHOD OF PREPARATION THEREOF

Yoshio Kagitani, Kashihara; Yasuo Ueda, Hirakata; Kozi Munechika, Yawata; Satoshi Morimoto, Nagaokakyo; Shirou Komeda, Tondabayashi; Kenji Tanaka, Yamatokoriyama, and Kazumasa Yokoyama, Toyonaka, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Filed Apr. 23, 1985, Ser. No. 726,321
Int. Cl.[4] C07G *7/00*; A61K *35/16, 37/04, 31/72*
U.S. Cl. 424—101 14 Claims

1. A method of preparing a fibronectin-dextran-drug complex in which fibronectin is connected through an dextran with a drug, which comprises reacting fibronectin, an oxidized dextran having aldohexopyranose ring-cleaved structure of the formula



and a drug which is selected from the group consisting of an antitumor agent, an antibiotic and an antiinflammatory agent, and has a group capable of combining with the oxidized dextran.

4,587,123

COMPOSITIONS AND METHODS FOR REDUCING PEST INFESTATION

Jacqueline S. Price, 12706 Califa St., North Hollywood, Calif. 91607

Filed Jun. 28, 1984, Ser. No. 625,623
Int. Cl.[4] A01N *65/00, 35/00, 31/00, 27/00*; A61K *7/06*
U.S. Cl. 424—195.1 24 Claims

1. A composition for reducing flying insect pest infestation of animals and human beings with topical application thereof by exhibiting pest repellent activity and pesticidal activity, said composition comprising:

(a) eucalyptus oil present in an amount of about 4% to about 22% by weight based on the total fluid weight of the composition,

(b) a low molecular weight and low carbon content alcohol miscible with water and present in an amount of about 9% to about 33% by weight based on the total fluid weight of the composition to provide pesticidal activity, and

(c) water present in an amount of about 45% to about 85% by weight based on the total fluid weight of the composition, and which composition contains the eucalyptus oil and alcohol in amounts to operate as an effective pest repellant pesticide and which does not become an animal or human irritant when used in a proper amount and regime.

4,587,124

COMPOSITION FOR TREATING CUTANEOUS WOUNDS

Tuk M. Kim, 2546 San Bruno Ave., San Francisco, Calif. 94134

Filed Oct. 25, 1984, Ser. No. 664,513
Int. Cl.[4] A61K *35/78*
U.S. Cl. 424—195.1 11 Claims

1. A method for treating cutaneous wounds comprising the step of applying thereto a composition comprising heat-treated oil extracts of fruit seeds of *Strychnos ignatii* Berg in a pharmaceutically acceptable carrier, said extracts formed by the steps of

(a) heating fruit seeds of *Strychnos ignatii* Berg in an amount of a pharmaceutically acceptable vegetable oil sufficient to allow such seeds to be immersed therein at a temperature above 150° F. for a period of time sufficient to cause a change in the relative densities between said oil and said seeds such that said seeds are caused to darken and to rise to the surface of said oil;

(b) separating said seeds from said oil;

(c) filtering the separated oil to form said composition.

4,587,125

NON-STALING CHEWING GUM COMPOSITIONS AND IMPROVED METHOD OF PREPARATION

Subraman R. Cherukuri, Towaco, N.J.; Frank T. Hriscisce, Astoria, N.Y.; Albert E. Siecke, Westfield, N.J., and You C. Wei, Bethlehem, Pa., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 644,734, Aug. 27, 1984. This application May 31, 1985, Ser. No. 740,146
Int. Cl.[4] A23G *3/30*
U.S. Cl. 426—3 14 Claims

1. A chewing gum composition having a moisture content of up to about 0.9% by weight of the final composition, comprising a gum base which softens in a temperature range of about 40° C. to about 60° C., a solid water-souble sweetening agent, a softener and a liquid flavoring agent, said chewing gum having an equilibrium relative humidity value lower than the ambient relative humidity, wherein said gum base is an elastomer selected from the group consisting of isobutylene-isoprene copolymers, polyvinylacetate, polyisobutylene, polyvinylalcohol, chicle, jelutong, balata, crown gutta-percha, lechicaspi, sorva and mixtures thereof.

4,587,126

REDUCED CALORIE YEAST LEAVENED BAKED PRODUCT

James C. Patton, Dallas; Richard G. Bennet; Dean J. Kasper, both of Denton County, and Eugene E. Wisakowsky, Garland, all of Tex., assignors to Campbell Taggart, Inc., Dallas, Tex.

Filed Nov. 30, 1983, Ser. No. 556,643
Int. Cl.[4] A21D *8/00*
U.S. Cl. 426—19 11 Claims

1. A yeast-leavened baked goods product comprising from about 5% to about 20% citrus fruit vesicle solids per 100 pounds of flour and having about 45% to about 52% moisture and having less than about 60 calories per ounce.

4,587,127

PROCESS FOR PRODUCING LIQUID SEASONING

Takeshi Akao, Abiko; Shuichi Nagata, Chiba; Katsumichi Osaki, Noda, and Yoshiharu Okamoto, Nagareyama, all of Japan, assignors to Kikkoman Corporation, Noda, Japan

Filed Sep. 21, 1983, Ser. No. 534,278
Claims priority, application Japan, Oct. 25, 1982, 57-186136
Int. Cl.[4] A23L *1/20*
U.S. Cl. 426—46 9 Claims

1. A process for producing a liquid seasoning, which comprises contacting a hydrolyzate of soy sauce raw materials, in liquid state at a pH of 4.0 to 9.0, with immobilized cells of soy sauce lactic acid bacteria for 30 minutes or more to obtain a lactic fermentation mixture, said hydrolyzate having been obtained by enzymolysis or chemical hydrolysis of said soy sauce raw materials which are proteinaceous materials selected from the group consisting of defatted soybean, whole soybean, wheat gluten, corn gluten, purified soybean protein, separated soluble protein, fish and shellfish, meat, and yeast extract, admixed with starchy material selected from the group consisting of wheat, barley and corn, and then subjecting said latic fermentation mixture to a fermentation by a soy sauce yeast to obtain a liquid seasoning.

4,587,128

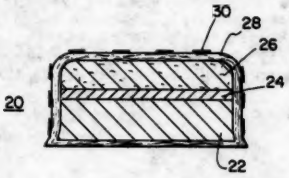
PROCESS FOR MAKING A SNACK FOOD PRODUCT

Raymond P. Cummings, Franklin Lakes, N.J., assignor to Borden, Inc., Columbus, Ohio

Filed Aug. 30, 1984, Ser. No. 645,701

Int. Cl.[4] A21D *13/08*

U.S. Cl. 426—303 2 Claims



1. A process for making a food product, said food product comprising:

a piece of cake having at least one exposed external generally planar coatable surface,

a bonding layer coated over said surface that is selected from the group consisting of jelly and creme, that prior to coating of said cake surface is sufficiently fluid so that upon coating thereon it penetrates into the cake beneath said surface, said bonding layer being applied as a strip of lesser extent in one dimension than said cake surface so as to leave two opposite marginal portions of said cake uncoated while extending as a continuous layer between said uncoated margins, and

a sticky icing coated over said entire bonding layer and over said uncoated marginal portions of said cake surface as a continuous layer of icing,

said iced cake having been compressed by a compressive force applied to said entire icing layer on said cake surface by a pressure bearing member,

said icing layer being pressed firmly into engagement with said bonding layer and being anchored to said cake by said bonding layer,

said process comprising:

applying said bonding layer of creme or jelly to said cake surface and permitting the creme or jelly to penetrate into the cake below its said coatable surface,

then applying over said entire layer of creme or jelly, and in contact therewith, and over said uncoated marginal portions of said cake surface and in contact therewith, a continuous topping layer of a sticky icing,

applying a pressure bearing member to said topping layer to press it into intimate contact with said layer of jelly or creme, and to press said layer of jelly or creme and said cake together, whereby said topping layer becomes bonded to said layer of jelly or creme and becomes anchored to said cake by said bonding layer, and then

enrobing the entire iced piece of cake in a solidifiable enrobing liquid that solidifies upon standing to form a continuous enrobing layer.

4,587,129

HYDROPHILIC GELS CONTAINING HIGH AMOUNTS OF FRAGRANCE

Charles K. Kliment, Princeton, N.J., assignor to National Patent Development Co., New York, N.Y.

Continuation of Ser. No. 46,317, Mar. 7, 1979, abandoned. This application Jun. 1, 1982, Ser. No. 383,963

Int. Cl.[4] A23L *2/26;* A61K *7/46*

U.S. Cl. 426—534 6 Claims

1. A solid, self-supporting, slow-release hydrogel composition consisting of a flavor or fragrance in an amount of 5 to 90% of the total composition weight entrapped in a hydrophilic copolymer of monomers consisting of either (a) at least one hydroxy lower alkyl 2-alkenoate, hydroxy lower alkoxy lower alkyl 2-alkenoate or with (a') another monoethylenically unsaturated copolymerizable monomer in an amount up to 50% by weight of component (a), the copolymerizable material not being present in an amount sufficient to destroy the hydrophylic properties of the copolymer, and (b) at least one polyethylenically unsaturated crosslinking agent, the amount of (a) being not over 65% of the total weight of monomers and the amount of (b) being 35 to 80% of the total weight of monomers and (c) 0 to 80% of the total weight of the composition of a solvent.

4,587,130

STORABLE PRODUCT WHICH CAN BE WHIPPED UP TO A DESSERT MOUSSE, AND A PROCESS FOR ITS PREPARATION

Niklaus Stauber, Thayngen, Switzerland, assignor to CPC International Inc., Englewood Cliffs, N.J.

Filed Dec. 5, 1983, Ser. No. 558,258

Claims priority, application Switzerland, Dec. 10, 1982, 7220/82

Int. Cl.[4] A23L *1/04;* A23G *9/02;* A23C *9/154*

U.S. Cl. 426—564 21 Claims

1. A process for the preparation of a solid base product, which is storage-stable at room temperature, used to prepare a dessert mousse consisting of:

(a) combining, as principal components, from ten to eighty percent (10–80%) by weight of solid or semi-solid edible fat, selected from the group consisting of cocoa butter, palm oil, peanut oil, coconut oil, and mixtures thereof, at a temperature higher than the melting point of said fat, with 0.1 to 15% by weight of binder, selected from the group consisting of gelatin, carrageenan, guar bean flour, carob bean flour, alginates, xanthan gum, modified starch and mixtures thereof, and 0.5 to 10% by weight of emulsifier, based on the total weight of the product, selected from the group consisting of monoglycerides and diglycerides of edible fatty acids, monoglycerides and diglycerides of edible fatty acids esterified with citric acid, diacetyltartaric acid, acetic acid, lactic acid, tartaric acid, 1,2-propylene glycol esters of edible fatty acids, sugar esters, sugar-glycerides, lecithin and mixtures thereof, with flavoring substances and a sweetener;

(b) mixing the molten mass thus formed into a homogeneous mass and forming said mass into a desired shape; and

(c) cooling the shaped mass.

4,587,131

EDIBLE WATER-IN-OIL EMULSION SPREADS CONTAINING DISCRETE GRANULES OR AGGLOMERATES OF GRANULES OF CRYSTALLINE STARCH

Janos Bodor, The Hague; Bertus M. Van Bodegom; Cornelis Poot, both of Vlaardingen, all of Netherlands, and Freek Reckweg, Hartley, Great Britain, assignors to Lever Brothers Company, New York, N.Y.

Filed Nov. 30, 1984, Ser. No. 677,004

Claims priority, application Netherlands, Dec. 1, 1983, 8304132

Int. Cl.[4] A23D *3/00*

U.S. Cl. 426—603 9 Claims

1. Edible water-in-oil emulsion spreads comprising a continuous fat phase of 20–90 wt. % and a dispersed aqueous phase of 10–80 wt. % of the total emulsion, said dispersed aqueous phase containing 1–25 wt. %, based on the total emulsion, of discrete granules or agglomerates of native, crystalline starch granules, 80–100% of which having a diameter of less than 25 microns.

4,587,132

PROCESS FOR THE DRYING OF FRUITS

John F. Fuller, Jr., Verona, Pa., assignor to H. J. Heinz Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 180,470, Aug. 22, 1980, Pat. No. 4,417,405. This application Nov. 23, 1983, Ser. No. 554,770
Int. Cl.[4] A23B 7/02; A23L 1/212
U.S. Cl. 426—640 4 Claims

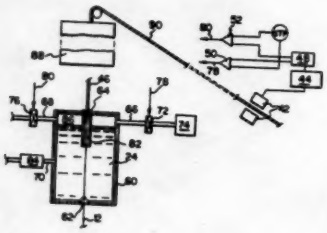
1. A process for the preparation of an unadulterated free-flowing, dried, pulped and finished fruit puree product in the form of flakes which are readily reconstitutable to the natural fruit puree consistency, said dried product being resistant to thermal set, which process comprises the steps of (1) preparing a fruit puree by pulping and finishing a fresh fruit so as to remove the skins and core materials therefrom; (2) adding an amount not more than about 11.0 wet weight percent crude fiber selected from the group consisting of fruit skins, fruit core materials free of seeds and pits, and mixtures thereof effective to render the fruit puree resistant to thermal set; (3) while maintaining the total sugar content of said puree at not more than about 80.0 percent and the ratio of the total sugar content to insoluble solids within the range of from about 5.0:1.0 to about 13.0:1.0; and (4) drying said fruit puree in the form of free-flowing flakes having resistance to thermal set.

4,587,133

PRODUCTION OF INSULATED ELECTRICAL CONDUCTORS

Michael A. Shannon, Glenburnie, and Steven D. Manders, Harrowsmith, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 6, 1984, Ser. No. 597,648
Int. Cl.[4] B05D 1/18, 7/20
U.S. Cl. 427—9 6 Claims



1. A method of forming a covering layer of substantially constant diameter upon an electrical conductor, the layer formed from composite material comprising magnetically permeable particles homogeneously mixed with a fluid carrier, the method comprising:

passing the conductor through a reservoir of the composite material in fluid form and vertically through a die orifice while subjecting the composite material within the reservoir to gas pressure to cause the composite material to apply a pressure at the die orifice to draw the material through the orifice and form the covering layer in fluid form upon the conductor; measuring the diameter of the layer as it moves away from the die orifice; and

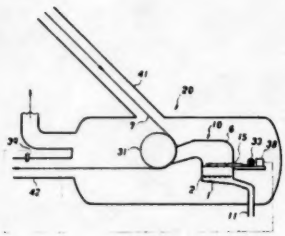
upon the diameter varying from that desired, adjusting the gas pressure in order to adjust the pressure of the composite material at the orifice to alter the rate of passage of the material through the orifice and change the diameter towards that desired.

4,587,134

METHOD OF RAPIDLY CHANGING DEPOSITION AMOUNT IN A CONTINUOUS VACUUM DEPOSITION PROCESS

Yoshio Shimozato; Tetsuyoshi Wada; Kenichi Yanagi; Mitsuo Kato; Heizaburo Furukawa; Kanji Wake, all of Hiroshima; Arihiko Morita, Sakai; Norio Tsukiji, Sakai; Takuya Aiko, Sakai; Toshiharu Kittaka, Sakai, and Yasuji Nakanishi, Sakai, all of Japan, assignors to Nisshin Steel Company, Ltd. and Mitsubishi Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed May 17, 1985, Ser. No. 735,442
Claims priority, application Japan, May 28, 1984, 59-106396
Int. Cl.[4] C23C 14/54
U.S. Cl. 427—10 6 Claims



1. A method for rapidly changing deposition amount in a vacuum deposition process comprising restricting the aperture of a shutter provided at the junction of the metal evaporation chamber and the vapor channel of the vacuum deposition apparatus to an area which chokes the vapor flow, changing the shutter aperture while maintaining the choked condition, and then changing the electric power supply to the heater of the evaporation chamber in response to the change in the shutter aperture area.

4,587,135

PROCESS FOR PRODUCING METALLIC COATINGS

Arnulf Diener, Dortmund; Hans Kettler, Wissen, and Ulrich Tenhaven, Dortmund, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Filed Nov. 7, 1984, Ser. No. 669,310
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1983, 3340840
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—13 7 Claims

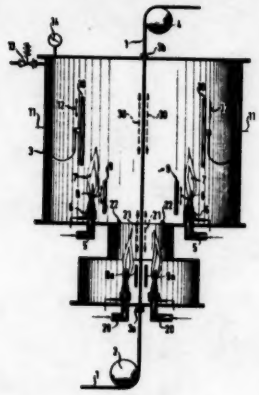
1. Process for continuously producing high-quality metallic coatings on steel strip utilizing a plasma, comprising the following steps:

(1) continuously evaporating one or several metals or metal alloys in a thermal plasma formed from non-oxidizing gas wherein said one or several metals or metal alloys are transformed into metal ions in the highly ionized state of the thermal plasma;

(2) passing said metal ion-containing thermal plasma to a deposition area which is separated from the location of step (1); and

(3) electrostatically depositing said metal ions onto the steel strip using an electrically-charged depositing plate which is in spaced-apart relationship from the steel strip, said depositing step being done at a pressure elevated by 100

Pa to 5,000 Pa above ambient pressure, the steel strip being held at a uniform temperature during said depositing



step and being coated at the rate of between 40 m/min and 600 m/min.

4,587,136

CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

James W. White, S. Glamorgan, and Brian J. Griffiths, Mid Glamorgan, both of United Kingdom, assignors to Dow Corning Ltd., Barry, Wales

Filed Mar. 20, 1985, Ser. No. 713,940

Claims priority, application United Kingdom, Apr. 4, 1984, 8408621

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—54.1 14 Claims

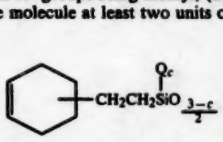
1. A curable organosiloxane composition comprising (A) an organosiloxane having in the molecule at least two siloxane units of the general formula

$$HSRSiO_{\frac{3-a}{2}} \quad (i)$$

wherein R represents a divalent saturated aliphatic hydrocarbon group having from 3 to 8 inclusive carbon atoms, R' represents a monovalent hydrocarbon group having from 1 to 6 inclusive carbon atoms and free of aliphatic unsaturation, an alkoxy group having from 1 to 4 carbon atoms or an alkoxyalkoxy group having from 2 to 6 carbon atoms and a has a value of 0, 1 or 2, any remaining units having the general formula

$$R''_bSiO_{\frac{4-b}{2}} \quad (ii)$$

wherein R'' represents a monovalent hydrocarbon group having from 1 to 6 carbon atoms and free of aliphatic unsaturation and b has a value of 0, 1, 2 or 3 at least 50 percent of the total R' and R'' groups being methyl, (B) an organosiloxane having in the molecule at least two units of the general formula



(iii)

wherein Q represents a monovalent hydrocarbon group having from 1 to 6 inclusive carbon atoms and free of aliphatic unsaturation, an alkoxy group having from 1 to 4 carbon atoms or an alkoxyalkoxy group having from 2 to 6 carbon atoms and c is 0, 1 or 2, any remaining units having the general formula

$$Q'_dSiO_{\frac{4-d}{2}} \quad (iv)$$

wherein Q' is as defined for R'' and d has a value of 0, 1, 2 or 3, at least 50 percent of the total Q and Q' groups being methyl, and (C) photoinitiator.

4,587,137

NOVEL DUAL CURE SILICONE COMPOSITIONS

Richard P. Eckberg, Saratoga Springs, N.Y., assignor to General Electric Company, Waterford, N.Y.

Continuation-in-part of Ser. No. 656,106, Sep. 28, 1984, abandoned. This application Sep. 19, 1985, Ser. No. 778,173

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—54.1 46 Claims

1. A curable composition comprising a polydiorganosiloxane containing silicon-bonded hydrogen atoms and silicon-bonded olefinic radicals in the same molecule, at least one part by weight per 100 parts by weight of said polydiorganosiloxane of at least one free radical photoinitiator and at least one precious metal-containing hydrosilation catalyst for effecting crosslinking of said silicon-bonded hydrogen atoms and said silicon bonded olefinic radicals.

4,587,138

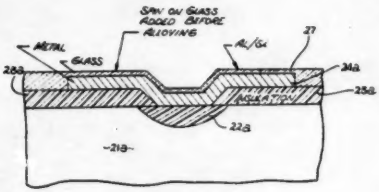
MOS REAR END PROCESSING

Leopoldo D. Yau, Durham; Robert A. Gasser, Jr., Cornelius; Kenneth R. Week, Jr., Sherwood; Jick M. Yu, Beaverton, and David D. Chin, Aloha, all of Oreg., assignors to Intel Corporation, Santa Clara, Calif.

Filed Nov. 9, 1984, Ser. No. 670,161

Int. Cl.[4] B05D *5/12*; G03C *7/26*

U.S. Cl. 427—88 7 Claims



1. A process for forming a patterned, alloyed conductive layer on a semiconductor body comprising the steps of:

a. depositing a metallic conductive layer over said semiconductor body;

b. depositing a layer of low temperature spin-on-glass on said conductive layer; said spin-on-glass containing dye; and,

c. any patterning of said conductive layer and heating cycle greater than 200 degrees C. done after said depositing of said low temperature spin on glass,

whereby the formation of hillocks and voids in said conductive layer is inhibited, and said spin-on-glass acts as an antireflective coating during patterning.

4. A process for forming a patterned, alloyed conductive layer on a silicon substrate comprising the steps of:

depositing a metallic conductive layer over said silicon substrate;

forming a layer of spin-on glass on said conductive layer, said spin-on glass layer containing dye;

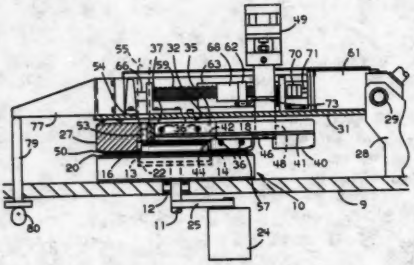
patterning said conductive layer utilizing photolithographic techniques;

heating said silicon substrate to a temperature sufficient to alloy said conductive layer and said silicon substrate.

4,587,139
MAGNETIC DISK COATING METHOD AND APPARATUS

James A. Hagan; James E. Maloy, and Myron A. W. Wilke, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 21, 1984, Ser. No. 685,087
Int. Cl.[4] B05D 5/12
U.S. Cl. 427—130 10 Claims



1. A spin coating apparatus for applying an ultra thin coating of a liquid magnetic material containing a volatile solvent on a rigid disk substrate comprising

means for rotatably mounting said disk;

means for rotating said disk at a first rotational speed and a second, higher rotational speed;

a closely confining barrier wall surface at one axial side of said disk;

an opening in said barrier wall surface;

dispensing means positioned at said opening for applying said liquid magnetic coating material to the disk surface at said on axial side through said opening;

closure means for selectively closing said opening in said barrier wall surface; and

means for positioning said barrier wall surface at a first distance from said disk surface which exceeds the maximum thickness of the liquid coating material applied by said dispensing means, said dispensing means being positioned to deliver said liquid magnetic material to said disk surface through said barrier wall opening while said disk is rotated at said first rotational speed and subsequently positioning said barrier wall surface at a second lesser distance, not exceeding 0.05 inch, at which position said opening is closed by said closure means and said disk is rotated at said second rotational speed.

4,587,140
METHOD FOR EMBEDDING ELECTRICAL AND ELECTRONIC CIRCUITRY

Constance A. Johnson, Hamden, and Aspet V. Merijanian, Middlebury, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Filed Sep. 27, 1984, Ser. No. 655,479
Int. Cl.[4] B05D 3/12
U.S. Cl. 427—372.2 5 Claims

1. A method for embedding circuitry comprising:

(a) applying to said circuitry a pourable composition comprising

(i) an ethylene-alpha-olefin copolymer having a molecular weight of from about 500 to about 20,000; and

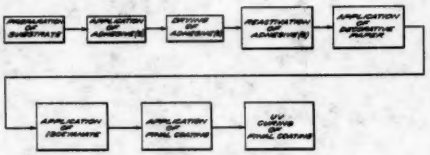
(ii) a curative; and

(b) exposing the resultant structure to curing conditions.

4,587,141
LAMINATED PANEL AND PROCESS

James Cooley, Orangeburg, S.C., assignor to U.S. Plywood Corporation, Wilton, Conn.

Filed Dec. 15, 1983, Ser. No. 561,904
Int. Cl.[4] B05D 3/02; B32B 27/10
U.S. Cl. 427—379 14 Claims



1. A process for forming a decorative panel comprising the steps of:

providing a generally planar substrate of particle board, fiber board, hard board or plywood and an ink imprinted decorative paper;

adhering the decorative paper directly to the substrate by applying at least one layer of an adhesive to said substrate, drying said at least one adhesive layer, subsequently reactivating said at least one adhesive layer by heating and joining said decorative paper to said substrate by applying the paper directly over the reactivated adhesive layer;

applying 0.5 mils wet to 5.0 mils wet of an isocyanate solution including an organic solvent portion to the decorative paper;

allowing the isocyanate solution to penetrate into the decorative paper;

drying the decorative paper and panel to remove the solvent portion of the isocyanate solution but allowing the isocyanate to remain;

applying a photo-durable top coat; and

curing the top coat.

4,587,142
ARTIFICIAL GRAIN LEATHER

Akira Higuchi, and Hisao Shimizu, both of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Jun. 21, 1984, Ser. No. 622,855
Claims priority, application Japan, Jul. 12, 1983, 58-126449
Int. Cl.[4] B32B 5/02, 33/00
U.S. Cl. 428—15 15 Claims

1. A artificial grain leather comprising a fibrous substrate and a coating layer, said fibrous substrate comprising a sheet having a body portion of entangled ultrafine fibers having a surface portion comprising a plurality of non-entangled ultrafine fibers attached to said body portion, said coating layer being formed upon said non-entangled ultrafine fibers and comprising at least a major portion of an elastic high polymer, and said coating layer, said non-entangled ultrafine fibers and said entangled ultrafine fibers being continuously connected in this order, wherein the finess of the ultrafine fibers is less than 0.7 denier, the density of non-entangled fibers is 50,000 to 250,000 fibers/cm^2, the length of the non-entangled fibers is

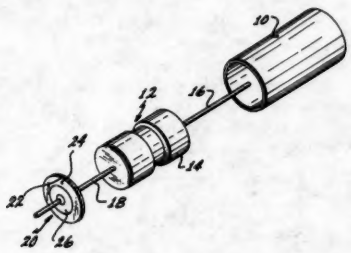
0.01–3.0 mm, and the density of the coating layer is between 0.9 and 1.3 g/cm^3.

4,587,143
Patent Not Issued For This Number

4,587,144
LOW LOSS, COMPRESSION, HERMETIC GLASS-TO-METAL-SEAL AND METHOD

Hillel Kellerman, 9323 Duxbury Rd., Los Angeles, Calif. 90034; David Kellerman, 1485 S. Cardiff Ave., Los Angeles, Calif. 90025, and Leonard J. Box, 1363 Pleasant Valley Way, West Orange, N.J. 07052

Filed May 13, 1982, Ser. No. 377,790
Int. Cl.^{4} H01R *43/00*; C03C *27/02*
U.S. Cl. 428—36 **9 Claims**



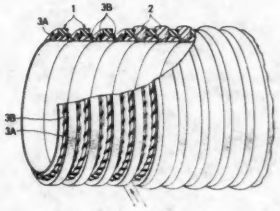
1. In a glass-to-metal seal surrounding a conductor passing therethrough an outer ring, a glass disc, and an inner eyelet of non-ferromagnetic material concentrically assembled inside said glass disc and ring, said glass being selected from glasses having a coefficient of thermal expansion of about 90 to 125 cm/cm/°C.$\times 10^{-7}$, said eyelet being made of nickel-molybdenum alloys having a nickel percentage of 65% to 74% and a molybdenum percentage of 26% to 30%.

7. A method for eliminating heating losses from induced electric and magnetic fields caused by electrical pulses passing along leads passed through hermetic end seals of electrical components of the type enclosed in a can hermetically closed at least one end by such an end seal comprising the steps of forming each end seal with an outer metal ring enclosing a glass disc having a metal eyelet therein through which the lead passes, the same being assembled when heated so that, after being cooled, compression is developed by the ring which is transferred through the disc to the eyelet, selecting the material of which said eyelet is made from a non-ferromagnetic nickel-molybdenum alloy having a cooefficient of thermal expansion of the approximate formula of Hastelloy B having a coefficient of thermal expansion of about 100 cm/cm/°C.$\times 10^{-7}$ and matching that of the glass disc, said alloy exhibiting a low magnetic and electrical induction loss characteristic.

4,587,145
FLEXIBLE HOSE

Shiro Kanao, No. 9-18, Nanpeidai 4-chome, Takatsuki-shi, Osaka, Japan

Filed Nov. 15, 1984, Ser. No. 671,836
Claims priority, application Japan, Jul. 31, 1984, 59-161671
Int. Cl.^{4} F16L *11/08*
U.S. Cl. 428—36 **17 Claims**



1. A flexible hose comprising:
a membrane having soft and hard strip members alternatively disposed in a spiral form, a connector element disposed through the center of the thickness of said soft strip member and spiral wound on the hose, said connector element having a plurality of projected portions, and; said projected portions and said hard strip adjacent said soft strip member being interconnected.

4,587,146
FLAT LAMINATE PART CONSISTING OF A SUBSTRATE LAYER, A COVER LAYER AND AN AUXILIARY PULL-OFF MEANS FOR THE COVER LAYER

Dieter Anhäuser, Melsbach; Gerhard Kreitlow; Hubertus Olbrich, both of Neuwied; Karl-Heinz Reinhold, Hausen; Günter Simon, Hillesheim, and Karl-Heinz Gockel, Solingen-Grüfrath, all of Fed. Rep. of Germany, assignors to Lohmann GmbH & Co. KG, Neuwied, Fed. Rep. of Germany

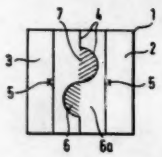
Filed Dec. 3, 1984, Ser. No. 677,381
Claims priority, application Fed. Rep. of Germany, Dec. 8, 1983, 3344335
Int. Cl.^{4} B32B *3/10, 7/06*
U.S. Cl. 428—41 **9 Claims**

1. A flat laminate part comprising:
a flexible substrate layer having at least one surface;
a cover layer at least partially on the one surface of said substrate layer;
means for effecting adhesion of said cover layer to said surface of the substrate layer in the area of said cover layer

such that the layers are securely held together but may be pulled apart;

a substantially continuous cut or preset breaking line in said cover layer from one edge to another edge of said cover layer thereby separating the cover layer into two parts, at least parts of said cut or preset breaking line respectively diverting substantially from a straight connection line between the end points of the cut at the edges of the cover layer into each part of said cover layer to define the locations of grasp parts; and

stiffened areas in said cover layer surrounding said cut or preset breaking line and including at least the grasp part



locations defined within said diverting parts of said cut or preset breaking line;

the stiffness of said stiffened areas and the adhesion between said substrate layer and said cover layer being such that, upon bending of the flat laminate part substantially along said straight connection line between the end points of said cut at the edges of said cover layer in a direction which produces a convex curvature of the exposed surface convexly on the side of the cover layer, said diverting parts of said cut or preset breaking line into each part of the cover layer are separated and peeled off from the substrate layer to thereby expose the grasp parts.

4,587,147

RETICULATED PRODUCTS AND THEIR MANUFACTURE

Donald G. Keith, Mount Eliza, Australia, assignor to A.A.R.C. (Management) Pty. Limited, Richmond, Australia

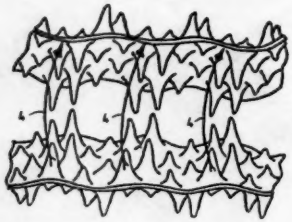
PCT No. PCT/AU84/00162, § 371 Date Apr. 1, 1985, § 102(e) Date Apr. 1, 1985, PCT Pub. No. WO85/01014, PCT Pub. Date Mar. 14, 1985

PCT Filed Aug. 28, 1984, Ser. No. 740,261

Claims priority, application Australia, Aug. 29, 1983, PG1090/83

Int. Cl.⁴ B32B *3/12, 3/28, 7/08*

U.S. Cl. 428—59 **16 Claims**



1. A reticulated material of substantially planar configuration formed by the conjunction of a plurality of strips of nonplanar sheet material in which the strips lie substantially perpendicular to the plane of the reticulated material, the edges of the strips lying coplanar with the reticulated material and forming opposite surfaces thereof, characterized in that each strip of nonplanar sheet material is formed on each opposite surface with a pattern of crests and valleys of repetitive wavelength such that each pattern repeat contains at least two crests and at least two valleys, wherein in each pattern repeat the height of at least one crest or valley on at least one surface of the strip is different from that of at least one of the other respective crests or valleys on said surface, and wherein the recurring height difference produces a corrugation along the strip having a wavelength greater than the wavelength of the crests and valleys, further characterized in that adjacent strips are abutted with the corrugation opposed to interfit at least one crest in a valley of each opposed corrugation.

4,587,148

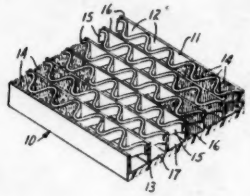
FLOCKED FLOOR MAT WITH FORAMINOUS LAYER

Douglas D. Campbell, Minneapolis, and Mary B. Donovan, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 19, 1985, Ser. No. 725,238

Int. Cl.⁴ B32B *3/06*

U.S. Cl. 428—88 **14 Claims**



1. A mat for removing soil and moisture from shoes and feet comprising:

a. a water-resistant, wear-resistant backing,

b. a water-resistant, wear-resistant foraminous element having a multiplicity of openings therein bonded to one surface of said backing, and

c. a multiplicity of water-resistant, wear-resistant bristles having one end bonded to said backing, said bristles being capable of protruding through said openings in said foraminous element to contact shoes and feet when said foraminous element is trod upon by pedestrians.

4,587,149

ELECTROSTATIC FLOCKING PRODUCTS WITH POLYURETHANE ADHESIVE

Tatsuya Murachi, Nishikasugai, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugaigun, Japan

Filed Mar. 13, 1985, Ser. No. 711,483

Claims priority, application Japan, Mar. 13, 1984, 59-48890

Int. Cl.⁴ B05D *1/14*

U.S. Cl. 428—90 **4 Claims**

1. An electrostatic flocking product comprising a base material having fixed to the surface thereof flocks through an adhesive layer, wherein;

(a) said adheisive layer is formed by polyurethane prepared by curing a mixture of an isocyanate prepolymer and polyisocyanate, with water, and

(b) the polyol raw material for said isocyanate prepolymer is a mixture of 1 mole of high molecular weight polyol as the main component and 0.4 to 1.5 moles of triethanolamine.

4,587,150

MAGNETIC RECORDING MEDIUM

Masaharu Nishimatsu, Komoro; Toshiaki Ide; Hiroyuki Arioka, both of Saku, and Yuichi Kubota, Komoro, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Aug. 1, 1984, Ser. No. 636,497
Claims priority, application Japan, Aug. 22, 1983, 58-151479
Int. Cl.[4] G11B 5/72
U.S. Cl. 428—141 5 Claims

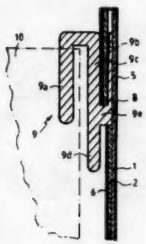
1. A magnetic recording medium comprising a plastic base film, a thin magnetic metal layer formed on one side of the base film and a backing layer formed on the other side of the base film, characterized in that the backing layer is composed essentially of a thermoset or radiation-cured resin and carbon black dispersed in the resin, and has a surface roughness of from 0.05 to 0.4 μm, said carbon black having an average particle size of from 10 to 60 mμm as measured by an electron microscope.

4,587,151

MOBILE BINDING

Francois Balland, 61-63, rue des Prairies, 75020 Paris, France

Filed Aug. 8, 1984, Ser. No. 639,258
Claims priority, application France, Aug. 11, 1983, 83 13410
Int. Cl.[4] B32B 1/04, 27/00
U.S. Cl. 428—156 5 Claims



1. Mobile binding comprising two sheets of semi-rigid material, which extend over the whole length of the binding and which are struck to each other, except at least in the end-portions of a spine of the binding, an opening being provided in the inner sheet of material, perpendicular to the spine, and elements for holding magazines, consisting of a clip of substantially S-form at each end of the spine, each clip having two end branches, one of said end branches being adapted to be inserted into the center of a magazine to be bound and the other end branch being adapted to be inserted through one of the openings of the inner sheet at the spine, and each clip having a central branch extended beyond the portion where it connects to said other end branch by an overlay that lies closely adjacent said inner sheet when said other branch is inserted through said opening, said one end branch of the clip being thinner than said other end branch in a direction perpendicular to the plane of the clip.

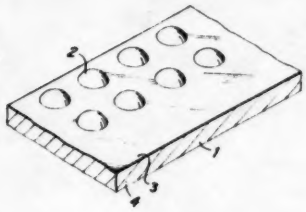
4,587,152

RESIDUELESSLY REDETACHABLE CONTACT-ADHESIVE SHEETLIKE STRUCTURES

Peter Gleichenhagen, Hamburg; Ekkehard Behrend, Halstenbek, and Peter Jaüchen, Hamburg, all of Fed. Rep. of Germany, assignors to Beiersdorf AG, Hamburg, Fed. Rep. of Germany

Filed Dec. 11, 1984, Ser. No. 680,422
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1983, 3346100
Int. Cl.[4] B32B 3/10, 7/14; C09J 3/14
U.S. Cl. 428—195 9 Claims

1. A residuelessly redetachable contact-adhesive sheetlike structure wherein are provided approximately calotte-shaped bonding sites which are up to about 600 μm in diameter at the base where the calottes stick to the sheetlike structure and



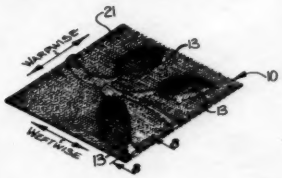
which are produced by screen or gravure printing using high-solids dispersions of adhesive substances.

4,587,153

WOVEN TEXTILE FABRIC AND METHOD OF MAKING THE SAME

Nancy W. Sells, Mebane, N.C., assignor to Fieldcrest Mills, Inc., Eden, N.C.

Filed Dec. 9, 1983, Ser. No. 559,741
Int. Cl.[4] B32B 3/00
U.S. Cl. 428—196 10 Claims



1. A decorative matelasse fabric of woven multi-ply construction including a closely woven face ply interwoven with an open woven back ply, said face ply having predetermined outwardly bulging fabric pattern areas thereon, said back ply having shrunken fabric float areas underlying said outwardly bulging fabric pattern areas in the face ply, said shrunken fabric float areas serving to maintain the outward bulge of the fabric pattern areas, at least some of said outwardly bulging fabric pattern areas being colored so as to contrast with the surrounding fabric background, and said colored areas presenting an ombre effect of shaded color areas of varying intensity of color so as to present a custom hand-painted appearance.

4,587,154

OIL AND GREASE ABSORBENT RINSABLE NONWOVEN FABRIC

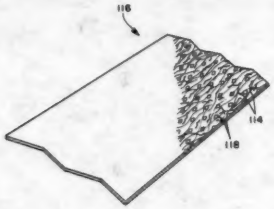
Harry W. Hotchkiss, Marietta; Robert D. Fields, Atlanta, and Gina K. Rolsten, Duluth, all of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Jul. 8, 1985, Ser. No. 752,986
Int. Cl.[4] B32B 3/00
U.S. Cl. 428—195 13 Claims

1. A treated nonwoven fabric having capillary suction properties essentially equivalent to such fabric untreated and grease rinsing properties of at least about 60 percent comprising a web of thermoplastic microfibers wherein such web contains up to about 3.5 percent by weight of a composition selected from the group consisting of:

(a) carboxymethyl cellulose and derivatives,

(b) polycarboxylic resins crosslinked with a bivalent metal ion,



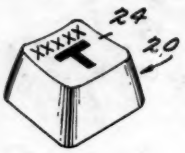
(c) hydroxyethyl ether starch derivatives, and
(d) polyacrylates.

4,587,155

METHOD OF APPLYING A DYE IMAGE TO A PLASTIC MEMBER AND THE IMAGE BEARING MEMBER THEREBY FORMED

David Durand, Portsmouth, R.I., assignor to Raymond Iannetta, Greenville, R.I., a part interest

Continuation of Ser. No. 584,818, Feb. 28, 1984, abandoned, which is a division of Ser. No. 377,666, May 12, 1982, abandoned. This application Mar. 15, 1985, Ser. No. 712,117
Int. Cl.[4] B32B *5/16, 27/36;* **D06P** *1/16*
U.S. Cl. 428—195 **5 Claims**



1. A plastic member having applied on a surface thereof a desired image, said image being the melt of a disperse dye diffused into said surface and into the adjacent portions of said plastic member therebeneath, said disperse dye having a melting point below the thermal deflection temperature of said plastic member and a vaporization temperature which is above said thermal deflection temperature and said disperse dye being selected from the group consisting of an azo dye, a pyrazolopyridine dye and an anthraquinone dye, said dye being substituted by at least one of a methoxy group, a nitrile group, a nitro group or a chlorine atom and being further substituted by (i) a cyano group and an acetoxy group or (ii) by two cyano groups.

4,587,156

DIRECTLY PRINTABLE PRESSURE-SENSITIVE ADHESIVE TAPE

Maan-shii S. Wu, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 585,413, Mar. 2, 1984, abandoned. This application Jan. 22, 1985, Ser. No. 692,366
Int. Cl.[4] B32B *5/16;* **C09J** *7/02*
U.S. Cl. 428—207 **8 Claims**

1. A pressure-sensitive tape comprising a non-fibrous backing, a layer of normally tacky and pressure-sensitive adhesive coated over and firmly adherently bonded to the face side of said backing, and a low adhesion backsize composition coated over and firmly adherently bonded to the backside of said backing, said low adhesion backsize composition being a mixture of

at least one low adhesion backsize compound, wherein said low adhesive backsize compound comprises at least about 10 percent by weight of said composition and is selected from the group consisting of (A) a higher-alkyl acrylate or higher-alkyl methacrylate ester copolymerized with at least one ethylenically unsaturated monomer, and (B) a terpolymer of (1) an ethylenically unsaturated monomer containing a fluoroalkyl group of at least 6 carbon atoms, (2) an ethylenically unsaturated monomer containing a free carboxylic acid group, and (3) an ethylenically unsaturated monomer containing a functional group which forms a conjugated system with its ethylenically unsaturated bond and is hydrolyzable to a free carboxylic group,

an ink anchoring resin, comprising a cellulose ester having at least about 0.5 percent by weight of hydroxyl groups and comprising from about 5 to about 50 percent by weight of said composition, and

a primer selected from the group consisting of chlorinated polyolefin and copolyester resin, wherein said ink anchoring resin and said primer have free surface energies within about 10 percent of the free surface energy of said low adhesion backsize compound.

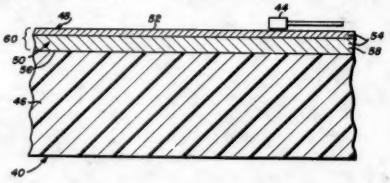
2. The tape of claim 1 further containing flexographic ink indicia firmly adhered to the surface of said backsize coating.

4,587,157

WEAR RESISTING UNDERCOAT FOR THIN FILM MAGNETIC RECORDING MEDIA

George W. Brock, Los Altos Hills, and George J. Hampton, Belmont, both of Calif., assignors to Verbatim Corp., Sunnyvale, Calif.

Filed Oct. 25, 1982, Ser. No. 436,285
Int. Cl.[4] G11B *5/72*
U.S. Cl. 428—216 **14 Claims**



1. A flexible magnetic recording media comprising:

a base film substrate layer;

a magnetic recording layer comprising a plurality of particles of a magnetic oxide coated over the base film substrate layer for magnetically communicating with external sensing devices; and

an intermediate layer comprising a plurality of particles of a non-magnetic oxide situated intermediate the base film substrate layer and the magnetic recording layer, said plurality of particles of non-magnetic oxide being of similar size, dispersion and weight concentration and possessing similar physical properties to those of said plurality of particles of magnetic oxide in the magnetic recording layer, the intermediate layer being a porous reservoir of lubricant for providing increased lubrication potential to the magnetic recording layer, the intermediate layer being in physical communication with the magnetic recording layer forming a composite layer, said composite layer being overcoated with a lubricant and in mechanical communication with the base film substrate layer, and said composite layer providing an added dimension of hardness to the magnetic recording layer and a reservoir of lubrication for the magnetic recording layer.

4,587,158

DEFORMABLE LABEL

William D. Ewing, 475 Highland Rd., Tiverton, R.I. 02878

Continuation-in-part of Ser. No. 575,187, Jan. 30, 1984, abandoned, and a continuation-in-part of Ser. No. 646,823, Sep. 4, 1984, abandoned. This application Aug. 26, 1985, Ser. No. 769,371

Int. Cl.[4] B32B *27/06, 27/32*

U.S. Cl. 428—219 3 Claims

1. A flexible and deformable label on a deformable container substrate comprising a printable polyethylene film layer, together with an adhesive layer affixed to said deformable substrate, the polyethylene layer derived from low density polyethylene having a specific gravity of from 0.910 to 0.925 g/cc and a tensile strength between 70 kg/sq.cm and 175 kg/sq.cm, and having a thickness between 0.0127 mm and 0.127 mm, wherein the polyethylene film is corona treated to enhace bonding with adhesive, and having printing on a side thereof and a layer of adhesive on a side thereof, said adhesive being selected from the group of materials generally characterized as pressure sensitive and being further characterized by the ability to form a bond with said film and the substrate such that the strength of the film-adhesive interface and the substrate-adhesive interface and the cohesive strength of the adhesive itself are both greater than the forces required for deformation and recovery of the film itself, such forces being greater than a minimum of 140 g/sq.cm, and wherein the substrate is selected from the group consisting of polyethylene (high and low density), polyvinyl chloride, polypropylene, polyester, polystyrene, natural rubber, and SBR rubber, said flexible label having improved and surprising characteristics of adhesion to the substrate with resistance to damage from cracking, tearing, creasing, wrinkling or shrinking due to physical abuse and flexing of the substrate material.

4,587,159

CLEAR SILICONE COATED FABRIC

Beth I. Gutek, Freeland, Mich., and Bernard Van Wert, Norcross, Ga., assignors to Dow Corning Corporation, Midland, Mich.

Filed Sep. 20, 1985, Ser. No. 778,461

Int. Cl.[4] B32B *7/00*

U.S. Cl. 428—251 9 Claims

1. A transparent or translucent silicone coated glass fabric comprising a first layer of polydiorganosiloxane, in which the organo radicals are methyl and phenyl radicals in a ratio of from 0.25 to 3.7, impregnating and coating the yarns of the glass fabric but not filling in the interstices of the glass fabric; a second layer of silicone elastomer covering the first layer and filling in the interstices of the glass fabric; and a third layer of elastoplastic organopolysiloxane resin to give a smooth, dry surface.

4,587,160

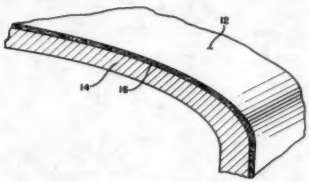
ELECTROSTATICALLY CONDUCTIVE PREMOLD COATING

Charles F. Williams, Brunswick, and Atam P. Sahni, Solon, both of Ohio, assignors to Ferro Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 503,861, Jun. 13, 1983, abandoned. This application Apr. 8, 1985, Ser. No. 720,992

Int. Cl.[4] D04H *1/58;* B32B *9/00*

U.S. Cl. 428—288 3 Claims



1. A molded plastic part having a surface comprising a premold conductive coating containing dispersed therethroughout graphite in the form of flake with a particle size of a maximum of at least about 5 microns up to 80 microns, or a mixture of graphite flake and fiber, wherein the flake is within the foregoing particle size range and the fiber is about 300 microns in length, and wherein the percent by weight of the total graphite in the coating is within the range of about 5% to about 30% by weight.

4,587,161

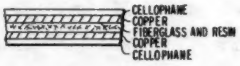
COPPER-CLAD POLYESTER-EPOXY-GLASS FIBER LAMINATES USING ZINC-COATED COPPER

David Barrell, 10148 Green St., Temple City, Calif. 91780; Donald E. Kennedy, 4960 Cutler Ave., Baldwin Park, Calif. 91706, and Donald C. Rollen, 5577 Riverdale Dr., Railto, Calif. 92376

Continuation-in-part of Ser. No. 349,676, Feb. 17, 1982, Pat. No. 4,446,173, which is a continuation-in-part of Ser. No. 291,929, Aug. 11, 1981, Pat. No. 4,420,509. This application Dec. 13, 1983, Ser. No. 561,036

Int. Cl.[4] D04H *1/58*

U.S. Cl. 428—288 16 Claims



1. A metal foil laminate comprising a sheet of glass fiber reinforced resin mixture, said resin mixture comprising from about 80% to about 90% by weight polyester resin and from about 10% to about 20% by weight epoxy resin, and having opposite faces and a sheet of electrogalvanized zinc-coated metal foil directly bonded to one of said faces.

4,587,162

RESIN COMPOSITION AND LAMINATE PRODUCED THEREFROM COMPRISING A CYCLIZED POLYBUTADIENE AND A PREPOLYMER OF A ISOCYANURIC OR CYANURIC ACID DERIVATIVE

Akira Nagai, Hitachi; Akio Takahashi, Hitachiota; Katuo Sugawara; Masahiro Ono, both of Hitachi; Ritsuro Tada, Mito; Motoyo Wajima, Hitachi, and Toshikazu Narahara, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 12, 1985, Ser. No. 754,449

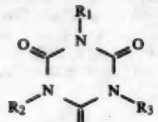
Claims priority, application Japan, Jul. 18, 1984, 59-147628

Int. Cl.[4] B32B *27/00;* G03C *1/68;* C08L *39/04*

U.S. Cl. 428—290 14 Claims

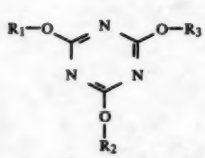
1. A resin composition comprising

a prepolymer prepared by polymerizing at least one compound of the formula:



(I)

or



(II)

wherein

R_1 through R_3 are independently hydrogen or an organic group, at least two of R_1, R_2 and R_3 being organic groups having at least one polymerizable unsaturated bond, and a cyclized polybutadiene.

4,587,163

PREPARATION OF ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE MORPHOLOGIES OF TOTALLY FUSED PARTICLES WITH SUPERIOR MECHANICAL PERFORMANCE

Anagnostis E. Zachariades, 65 Glen Garry Way, Hillsborough, Calif. 94010

Continuation-in-part of Ser. No. 586,796, Mar. 6, 1984, abandoned. This application Nov. 1, 1984, Ser. No. 667,020

Int. Cl.[4] B32B *27/32*

U.S. Cl. 428—292 **19 Claims**

15. An anisotropic morphology of ultra-high-molecular-weight polyethylene comprising:

a solid-state deformed semicrystalline morphology, having no memory of a granular nature, deformed at a temperature near but below its crystalline melting point at a deformation ratio of about 5 to 8.

16. The anisotropic morphology of ultra-high-molecular-weight polyethylene in claim 15 wherein the solid state deformed morphology is filamentary or ribbon-like.

4,587,164

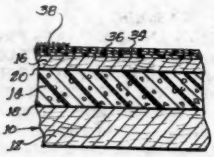
ROOF DECK COMPOSITE PANELS

Thurman W. Freeman, Newark, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 29, 1985, Ser. No. 728,413

Int. Cl.[4] B32B *3/26, 7/12, 13/00*

U.S. Cl. 428—314.4 **4 Claims**



1. A composite panel comprising a first sub-panel comprising wood fibers bonded with an inorganic cement comprising magnesium oxysulfate, a second sub-panel bonded to said first sub-panel and comprising a foam resinous plastic insulation, and a third sub-panel bonded to said second sub-panel and comprising a resin bonded wood product.

3. A composite panel as set forth in claim 1 wherein said second sub-panel comprises a closed cell polystyrene foam insulation.

4,587,165

FILMS OF A COPOLYMER OF AN ESTER DERIVED FROM A FLUORINE-CONTAINING ALCOHOL

Akira Ohmori; Nobuyuki Tomihashi, and Sinji Tamaru, all of Osaka, Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 440,305, Nov. 9, 1982, abandoned. This application Aug. 13, 1984, Ser. No. 639,855

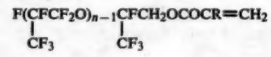
Claims priority, application Japan, Nov. 12, 1981, 56-182518; Nov. 24, 1981, 56-188973

Int. Cl.[4] C08F *14/18*

U.S. Cl. 428—334 **15 Claims**

1. An original plate for dry offset printing comprising a substrate suitable for preparation of an offset printing plate and a film formed on said substrate, said film consisting essentially of:

a copolymer formed from at least 40% by weight of a monomer of the formula:



(II)

wherein n is an integer of 2 to 7 and R is hydrogen or methyl; and at least one other ethylenically unsaturated monomer.

4,587,166

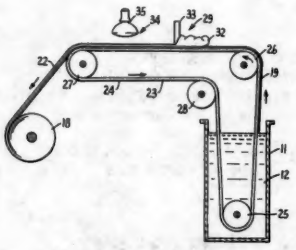
PLATED MAGNETIC RECORDING MATERIAL AND PROCESS FOR MAKING SAME

Marvin C. Garrison, San Carlos, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Feb. 16, 1983, Ser. No. 466,805

Int. Cl.[4] G11B *5/66*

U.S. Cl. 428—336 **13 Claims**



1. Continuous process for making a plated magnetic recording material in the form of a continuous length laminated composite film comprising:

(a) plating a passivated smooth continuous length surface with a continuous film of ferromagnetic metal having a thickness in the range of 0.05 to 10 microns;

(b) applying a nonmagnetic base film to the plated continuous surface to form said laminated composite composed of said continuous film of ferromagnetic material secured directly to said nonmagnetic base film; and

(c) stripping the laminated composite from the continuous surface.

8. A plated magnetic recording medium comprising a continuous length laminated composite film of:

(a) a nonmagnetic base film layer; and
(b) a thin plate of a continuous film of ferromagnetic metal having a thickness in the range of 0.05 and 10 microns secured directly to one side of the base film layer, the surface contour of which is substantially independent of the surface contour of the side of the base film to which the plate is secured.

4,587,167

PRINTABLE RELEASE-COATING COMPOSITIONS AND PRINTING INK FOR PRESSURE-SENSITIVE ADHESIVE TAPE

Adriano Maietti, Casale Monferrato, and Carlo Borgatelli, Rive, both of Italy, assignors to Vibac S.p.A., Ticineto, Italy

Filed Apr. 30, 1984, Ser. No. 605,255
Claims priority, application Italy, May 3, 1983, 67479 A/83
Int. Cl.[4] C09J 7/02, 7/04
U.S. Cl. 428—352 4 Claims

1. A pressure-sensitive adhesive tape consisting of:
a substrate consisting of a polyolefin film;
a layer of pressure-sensitive adhesive on one face of said substrate; and
a release layer on the other face of said substrate, the release layer consisting of a two-component polymeric composition consisting essentially of:
from 20 to 60% by weight of a ketone resin which is the aldol condensation product of cyclohexanone and formaldehyde, the ketone resin having a softening point of about 98° C., an acid number of substantially zero, and an hydroxyl number of 268, and
from 20 to 40% by weight of a polyamide resin made by the condensation of at least one fatty acid selected from fatty acid dimers and trimers with at least one amine selected from diamine and triamine, the polyamine resin having an amine number of no more than 3 mg KOH/g, an acid number of no more than 4 mg KOH/g, and a molecular weight of from 500 to 5,000.

4,587,168

HOLLOW FIBER MEMBRANE FOR DIALYSIS

Morio Miyagi; Makoto Ohno, both of Otsu, and Masaru Kanaizumi, Shiga, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Apr. 5, 1984, Ser. No. 596,974
Int. Cl.[4] B01D 39/00; D02G 3/00
U.S. Cl. 428—369 2 Claims

1. A hollow fiber membrane of a cellulose ester for dialysis, said hollow fiber membrane having a membrane thickness of less than 20 ct, and a yield strength S_b (g/filament) after heat-treatment at 80° C. for 20 hours satisfying the following formula (I):

$0.90 \leqq S_b/S_a \leqq 1.10$ (I) wherein S_a represents the yield strength (g/filament) of the hollow fiber membrane which is measured before heat treatment, and further wherein the membrane has crimps of a crimp number of 10 to 35 per 10 cm length of the membrane and a crimp amplitude in the range of from 65% of the outer diameter of the hollow fiber membrane to 50μ plus the outer diameter of the hollow fiber membrane.

4,587,169

ABRASION RESISTANT COATINGS

John F. Kistner, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St.Paul, Minn.

Filed Aug. 17, 1984, Ser. No. 641,723
Int. Cl.[4] B32B 27/38
U.S. Cl. 428—413 12 Claims

1. An abrasion-resistant, water-repellent film on a substrate, said film comprising the reaction product of a composition comprising:
(1) more than 60% by weight of an epoxy-terminated silane,
(2) 5 to 20% by weight of an aliphatic monoepoxide having between 8 and 20 carbon atoms in the aliphatic group, and
(3) less than 10% by weight of a material copolymerizable with epoxy groups, other than the aliphatic monoepoxide.

4,587,170

MAGNETIC RECORDING MEDIUM

Kazuko Hanai; Takashi Yoneyama, and Toshihisa Ito, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 28, 1984, Ser. No. 625,770
Claims priority, application Japan, Jun. 30, 1983, 58-118496
Int. Cl.[4] G11B 5/70
U.S. Cl. 428—425.9 8 Claims

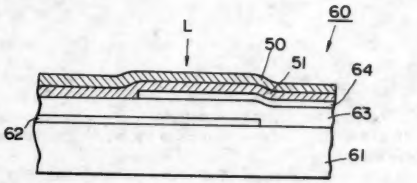
1. A wear resistant magnetic recording medium comprising a non-magnetic support having coated thereon a magnetic recording layer comprising ferromagnetic particles dispersed in a binder, the binder containing polyisocyanate and polyurethane and the molar ratio of (urethane bond+allophanate bond):(urea bond+biuret bond) being 85:15 to 60:40, wherein the main component of the binder is a vinyl chloride copolymer, nitrocellulose or a mixture thereof.

4,587,171

PROCESS FOR FORMING PASSIVATION FILM ON PHOTOELECTRIC CONVERSION DEVICE AND THE DEVICE PRODUCED THEREBY

Toshihisa Hamano; Takeshi Nakamura, and Mario Fuse, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 570,679, Jan. 13, 1984, abandoned. This application Apr. 24, 1985, Ser. No. 726,295
Claims priority, application Japan, Feb. 3, 1983, 58-16740
Int. Cl.[4] B32B 9/04
U.S. Cl. 428—448 6 Claims



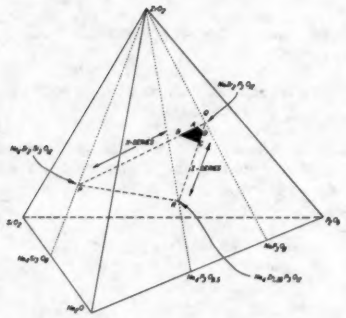
1. In a photoelectric conversion device having hydrogenated amorphous silicon between a transparent upper conductive electrode and a lower electrode on a substrate, a junction between said hydrogenated amorphous silicon and said electrically conductive electrode and covered with passivation film, the improvement comprising a first passivation film of silicon oxide formed by plasma chemical vapor deposition below 400° C. and a second passivation film of silicon nitride covering said first passivation film and formed by plasma chemical vapor deposition below 400° C., said photoelectric conversion device having a lower dark current value than a corresponding device having a passivation film of silicon oxide alone or of silicon nitride alone and having a light/dark current ratio substantially the same as a corresponding device having no passivation film.

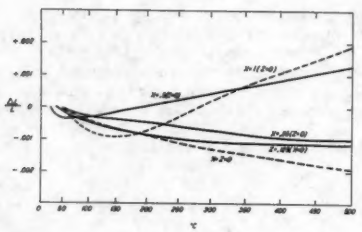
4,587,172

MIRROR SUBSTRATE OF ATOMICALLY SUBSTITUTED NA ZR_2PO_{12} LOW EXPANSION CERAMIC MATERIAL

Rustum Roy, State College, Pa., and Jaime Alamo, Velencia, Spain, assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jun. 1, 1984, Ser. No. 616,368
Int. Cl.[4] B32B *18/00*; C01B *25/37*; G02B *1/00, 17/00*
U.S. Cl. 428—450 4 Claims





1. An optical reflector characterized by resistance to distortion and fracture under variations in temperature, which comprises:

a substrate fabricated of low expansion (25° C.-500° C.) ceramic material and an optically reflecting film deposited on the substrate, the ceramic material being of single phase crystal structure having a composition represented by a molecular formula i (Na) j $(Zr_{2-z}Na_{4z})$ k $(P_{3-x}Na_xSi_x)O_{12}$ where i, j and k represent molar proportions and x and z represent atomic proportions of constituents respectively of the ceramic material, wherein:

molar proportions i, j and k are individually in the range from about 0.9 to about 1.1, and i+j+k is equal to 3; and

for molar proportions i, j and k individually equal to 1.0, the composition falls within the area defined by the points A, B, C and D in the quaternary diagram of FIG. 2, the coordinates of the points being:

A: x=0.2, z=0
B: x=0.6, z=0
C: x=0, z=0.25
D: x=0, z=0.125

4,587,173

METHOD FOR IMPROVING ADHESION OF JOINT COMPOUND TO METAL CORNERBEAD

Geronimo E. Lat, Skokie, and Terrance L. Williams, Crystal Lake, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed Apr. 26, 1984, Ser. No. 603,926
Int. Cl.[4] C23F *11/00*
U.S. Cl. 428—457 6 Claims

1. In the method for covering a metal cornerbead on a plasterboard wall with a joint compound, the improvement which consists essentially of applying an aqueous solution of a water reducible or water solubilizable acrylic resin to the metal to form a film which improves the adherence of the joint compound to the metal.

6. A metal cornerbead having a film consisting essentially of a water-wettable acrylic resin and a tightly adhering layer of a joint compound on its surface.

4,587,174

TUNGSTEN CERMET

Hironori Yoshimura; Naohisa Ito, both of Tokyo; Kenichi Nishigaki, and Katsunori Anzai, both of Omiya, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1983, Ser. No. 564,958
Claims priority, application Japan, Dec. 24, 1982, 57-230408; Dec. 24, 1982, 57-230409
Int. Cl.[4] C22C *29/04, 29/14*
U.S. Cl. 428—552 12 Claims

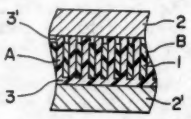
1. A tungsten cermet for use in cutting tools, including a carbonitride having titanium and tungsten, the cermet consisting essentially of, about 10 to about 50% by weight of the carbonitride, about 0.5 to about 10% by weight of aluminum oxide, not more than about 1% by weight of inevitable impurities, balance tungsten.

4,587,175

LAMINATE SHEETS

Mutsuo Akao, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 26, 1984, Ser. No. 686,385
Claims priority, application Japan, Dec. 28, 1983, 58-251914
Int. Cl.[4] B32B *3/10*
U.S. Cl. 428—596 20 Claims



1. A laminate sheet of at least three layers including a perforated sheet layer, and flexible sheet layers laminated on both sides of the perforated sheet layer wherein:

(a) said perforated sheet layer has a thickness of 0.006 to 1.0 mm and an aperture rate of 10 to 90%,

(b) an adhesive layer is applied on only one of said flexible sheet layers and the other flexible sheet layer is bonded by the adhesive layer extending throughout said apertures, and

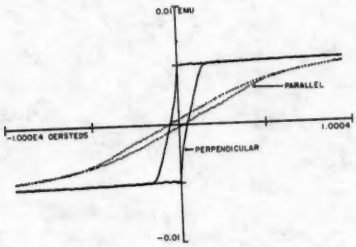
(c) said two flexible sheet layers are bonded together through said perforated sheet layer by means of said adhesive layer over an area of 5 to 95% of the overall area.

4,587,176

LAYERED COHERENT STRUCTURES FOR MAGNETIC RECORDING

Peter F. Carcia, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 14, 1985, Ser. No. 690,886
Int. Cl.[4] H01F *1/00*
U.S. Cl. 428—611 15 Claims



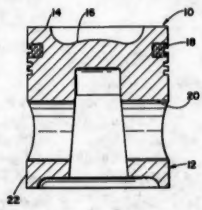
1. A layered coherent structure characterized by periodic, alternating layers of cobalt and palladium and/or platinum, wherein each cobalt layer is less than about 8 Å thick, and each palladium and/or platinum layer is greater than about 0.65 λ in thickness, where λ represents the total thickness of a single period.

4,587,177

CAST METAL COMPOSITE ARTICLE

Milton E. Toaz, Bedford, and Martin D. Smale, Parma, both of Ohio, assignors to Imperial Clevite Inc., Glenview, Ill.

Filed Apr. 4, 1985, Ser. No. 719,938
Int. Cl.[4] B22D *25/00, 19/02*
U.S. Cl. 428—614 7 Claims



1. A cast metal article comprising a body made from a metal taken from the group consisting of aluminum, magnesium, zinc and alloys thereof, said body having a first part of only said metal and a second composite part containing both said metal and a preform insert member of a ceramic fiber material, said preform insert member having a first preselected characteristic portion directly adjacent said first body portion oriented for achieving a highly reliable bond between the first part of the body and the second composite part, a second preselected characteristic portion apart from said first preselected characteristic portion oriented for providing optimum thermal fatigue and wear properties, thereby not necessitating the need for a special surface coating.

4,587,178

MAGNETIC RECORDING MEDIUM

Shigeo Shimizu, Yokohama; Toshio Kato, Yamato; Hitoshi Oda, Yokohama, and Masanobu Shigeta, Isehara, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Jul. 26, 1982, Ser. No. 401,967
Claims priority, application Japan, Jul. 27, 1981, 56-116474
Int. Cl.[4] H01F *10/02*
U.S. Cl. 428—615 11 Claims

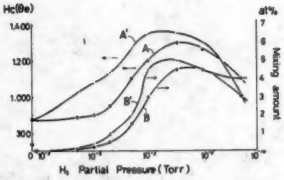
1. A magnetic recording medium comprising a support, a first layer having a thickness of 5 to 5000 Å and made of cobalt or a cobalt alloy containing up to 30 wt % of at least one member selected from the group consisting of Ni, Fe, Cu, W, Cr, and Ru and the balance of cobalt, said first layer being formed on one surface of said support by an oblique-incidence vacuum evaporation, and a second layer having a thickness of 200 to 25,000 Å and made of cobalt or a cobalt alloy containing up to 40 wt % of Ni and up to 8 wt % of P, said second layer being formed on said first layer by electroplating or electroless plating.

4,587,179

MAGNETIC RECORDING MEDIUM AND MANUFACTURING PROCESS THEREOF

Kyuzo Nakamura, and Yoshifumi Ota, both of Yachimata, Japan, assignors to Nihon Shinku Gijutsu Kabushiki Kaisha, Kanagawa, Japan

Filed Nov. 7, 1983, Ser. No. 549,518
Claims priority, application Japan, Nov. 9, 1982, 57-195234
Int. Cl.[4] G11B *5/64*
U.S. Cl. 428—694 5 Claims



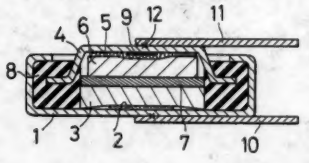
1. A magnetic recording member characterized in that a magnetic film formed on a surface of a substrate has a very small amount of hydrogen mixed therein, the mixing amount of hydrogen atom being about 0.2–7 at.%.

4,587,180

NON-AQUEOUS CELL HAVING CONNECTING TABS

Mitsunori Hara; Yukiteru Yoshihira, and Toshiro Furuhashi, all of Sumoto, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Feb. 3, 1982, Ser. No. 345,398
Claims priority, application Japan, Feb. 10, 1981, 56-17371[U]; Feb. 20, 1981, 56-23778[U]; Feb. 24, 1981, 56-25355[U]
Int. Cl.[4] H01M *14/00*
U.S. Cl. 429—8 8 Claims



1. A non-aqueous cell having a negative electrode of a light metal pressure-bonded either directly or through a medium of

a negative-electrode current collector to the inner surface of a negative terminal case so as to maintain electrical contact between the negative electrode and the case, and a connecting tab bonded by welding at one end thereof to the outer surface of said negative terminal case, said non-aqueous cell having a means for buffering heat transfer disposed inside said negative terminal case allowing said connecting tab to be bonded by welding at one end thereof to the outer surface of said negative terminal case at the position opposite that of said means for buffering heat transfer.

4,587,181

LEAD ACID RECOMBINATION CELLS

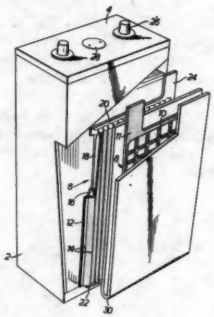
Ian K. Gibson, and Kenneth Peters, both of Worsley, England, assignors to Chloride Group Public Limited Company, London, England

Filed Nov. 29, 1984, Ser. No. 676,422

Claims priority, application United Kingdom, Nov. 29, 1983, 8331785

Int. Cl.[4] H01M *10/14*

U.S. Cl. 429—59 **4 Claims**



1. A lead acid recombination cell comprising a sealed container containing electrolyte, negative plates and positive plates alternating with said negative plates, said positive plates comprising a plurality of parallel tubes of porous material having recesses between them and which contain active material and along the interior of each of which a conductive spine extends, adjacent plates being separated by sheets of compressible fibrous absorbent separator material having an uncompressed thickness in excess of 2 mm, with each separator being compressed between adjacent plates so that it is pressed into the recesses between the parallel tubes of the positive plates to ensure intimate contact of the separator with said plates, substantially all of said electrolyte being absorbed in said plates and said separator material and being present in an amount sufficient to establish electrical contact between the plates while leaving sufficient voids in the separator material for migration of oxygen gas.

4,587,182

CONSTANT VOLUME LITHIUM BATTERY CELL AND PROCESS

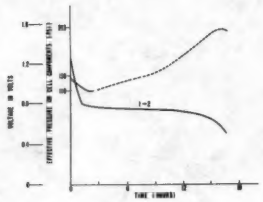
James A. R. Stiles, North Vancouver; Klaus Brandt, Vancouver; David S. Wainwright, Vancouver, and Keith C. Lee, Vancouver, all of Canada, assignors to Moli Energy Limited, Canada

Filed Dec. 11, 1984, Ser. No. 680,382

Int. Cl.[4] H01M *6/14*

U.S. Cl. 429—94 **19 Claims**

1. A battery cell comprising a substantially fixed volume container containing cell components therein in voltaic relationship, said cell components including an anode comprising lithium metal, a non-aqueous electrolyte and a cathode in a spatial relationship to the anode within the fixed volume container, said cathode comprising cathode active material which upon discharge intercalates lithium and undergoes a phase transition to a distinct structural phase in which phase the cathode active material can reversibly operate and which phase provides a cathode expansion greater than the anode volume decrease upon discharge, wherein said spatial relationship and said cathode expansion within said substantially fixed volume are sufficient to produce a compressive load on the anode which inhibits the formation of a porous deposit of exterior, irregularly oriented, amalgamated lithium grains on the anode when the cell is reversibly operated with the cathode in said phase.



4,587,183

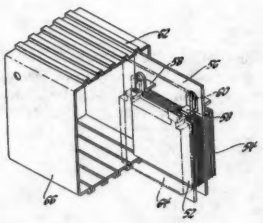
EXTRUDED COMPARTMENTALIZED CONTAINER

Charles P. McCartney, Jr., Yorktown, Ind., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 385,495, Jun. 7, 1982, Pat. No. 4,547,236. This application Jun. 6, 1985, Ser. No. 742,220

Int. Cl.[4] H01M *2/02*

U.S. Cl. 429—176 **1 Claim**



1. A multi-cell battery container having a shell portion adapted to receive covers at opposite ends thereof and comprising a rectangular, tubular extrusion having a first pair of opposing walls integral with, and at right angles to, a second pair of opposing walls, said walls together defining a central cavity for containing the battery's several cells;

said walls of said first pair each having an external ridge extending the length of said wall between said ends and parallel to said second pair of walls, said ridge having a channel-like configuration including opposite-facing sidewalls defining therebetween an elongated groove coextensive with said ridge and opening into said cavity, the groove in one said ridge being directly opposite the groove in the other said ridge across said cavity; and

at least one partition extending between said first pair of opposing walls parallel to said second pair and dividing said cavity into at least two compartments, said partition having sealing borders extending along opposite edges thereof and mating with said grooves, each said borders lying between, and fused to at least one of, said groove-defining sidewalls so as to secure said partition to said first pair of walls and seal-off adjacent compartments one from

the other against ionic transport therebetween when said container is filled with electrolyte.

4,587,184

METHOD FOR MANUFACTURING ACCURATE STRUCTURES WITH A HIGH ASPECT RATIO AND PARTICULARLY FOR MANUFACTURING X-RAY ABSORBER MASKS

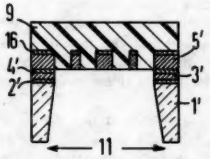
Brigitte Schneider-Gmelch, and Joseph Mathuni, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 7, 1984, Ser. No. 618,416

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1983, 3327088

Int. Cl.[4] G03F *9/00*

U.S. Cl. 430—5 9 Claims



1. A method of manufacturing an X-ray absorber mask comprising the steps of providing a substrate of a material selected from a group consisting of glass, quartz and silicon; applying a first adhesion layer on the substrate; applying a first back-etching layer on the first adhesion layer; applying a second adhesion layer on the back-etching layer; applying an absorption layer on the second adhesion layer; applying an auxiliary layer on the absorber layer; applying a passivation layer on the auxiliary layer; applying a lacquer layer on the passivation layer, said lacquer layer being a material sensitive to radiation selected from a group consisting of X-rays, photons, ions and electrons; forming a mask in the lacquer layer to expose portions of the passivation layer, said step of forming a mask including exposing the lacquer layer to radiation of said group; etching exposed portions of the passivation layer and the underlying portions of the auxiliary layer and absorber layer with an ion beam etching with argon as an etching gas for a given duration of time, said duration of time being broken up in different segments and said etching step including changing the etching angle of the beam at the beginning of each segment; then removing the lacquer mask and the passivation layer; oxidizing the auxiliary layer to form an oxide mask; subsequently etching the absorber layer utilizing the oxide mask to produce the absorber mask with the desired structure, said etching being a reaction ion beam etching for a given duration of time with oxygen and argon being the etching gases, said duration of time being broken into segments with the direction of the etching beam being changed at the beginning of each segment; applying a polyimide layer on the etched surface to fill all of the cavities formed in the absorber mask, then etching the opposite side of the substrate to remove selected portions of the substrate, the first and second adhesion layers and the first back-etching layer to expose the desired structure in the absorber mask, said etching being an ion beam etching with argon as the etching gas.

4,587,185

PHOTOMASK FOR USE IN MAKING A CARRIER TAPE

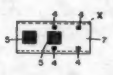
Shu Miyazaki, Fussa, Japan, assignor to Sumitomo Metal Mining Co., Ltd., Tokyo, Japan

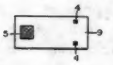
Division of Ser. No. 550,380, Nov. 10, 1983. This application Jun. 29, 1984, Ser. No. 626,197

Claims priority, application Japan, Nov. 12, 1982, 57-198735

Int. Cl.[4] G03F *9/00;* G03C *5/00*

U.S. Cl. 430—5 4 Claims





1. A photomask for use in making a carrier tape, said photomask consisting of a base element which includes an elongated section that is divided into an elongated middle portion and opposite elongated outer portions, said base element having a single finger lead pattern and a single pair of aligned sprocket hole patterns extending therethrough, said single finger lead pattern being located in said elongated middle portion of said elongated section and the sprocket hole patterns of said single pair of aligned sprocket hole patterns being respectively located in said opposite elongated outer portions of said elongated section, said single pair of aligned sprocket hole patterns being displaced along said elongated section from said single finger lead pattern a certain distance equal to one pitch or multiples thereof, said single finger lead pattern having no sprocket hole patterns located laterally outwardly thereof and said single pair of sprocket hole patterns having no finger lead pattern located laterally inwardly thereof; said photomask being positionable between a light source and a metallic foil tape having a photoresist material on a side thereof which faces said photomask such that light passing through said photomask can strike sequential portions of said photoresist material on said metallic foil tape and form finger lead clusters in a middle part thereof and aligned pairs of sprocket holes along opposite outer parts thereof, said metallic foil tape being provided with a succession of figure lead clusters formed in the middle part thereof which are separated by a distance equal to one pitch and, each finger lead cluster having a pair of aligned sprocket holes located laterally thereof along the length of said metallic foil tape, except for the number of figure lead clusters at the lead end of said metallic foil tape equal to the number of pitches the single pair of aligned sprocket hole patterns are spaced from the single figure lead pattern on said photomask.

4,587,186

MASK ELEMENT FOR SELECTIVE SANDBLASTING AND A METHOD

Shohei Nakamura, and Yoshimasa Tuji, both of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 493,909, May 12, 1983, Pat. No. 4,456,680. This application Apr. 19, 1984, Ser. No. 601,825

Claims priority, application Japan, May 13, 1982, 57-79184; Nov. 14, 1983, 58-213472; Nov. 14, 1983, 58-213473

Int. Cl.[4] B24B *1/00;* G03C *11/12, 1/80, 1/70*

U.S. Cl. 430—14 7 Claims

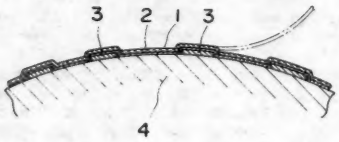
1. A mask element for selective sandblasting, which com-

prises a support film layer and, superimposed on the support film layer in the following order, a destroyable retainer film layer of a water-insoluble cellulose derivative and sticky photoresist layer of a predetermined pattern mask constituted by solid image portions and vacant image portions and adherable, without the aid of an adhesive or the aid of the retainer film layer, to the surface of an article body to be engraved with a strength such that the mask is not detached therefrom during sandblasting, said support film layer being adapted to be stripped from the destroyable retainer film layer while maintaining adherence of the destroyable retainer film layer to the photoresist layer, said destroyable retainer film layer being not sticky and not adherable to said surface and being adapted to be destroyed by sandblasting while said solid portions of the photoresist layer are resistant to sandblasting.

6. A method for producing a pattern-engraved article, which comprises:

(1) adhering to the surface of an article body to be engraved one surface of a sticky photoresist layer of a predetermined pattern mask constituted by solid image portions and vacant image portions and adherable, without the aid of an adhesive or the aid of the retainer film layer, to said surface with a strength such that the mask is not detached therefrom during sandblasting,

said sticky photoresist layer being attached, on its other surface to a support film layer through the medium of a



destroyable retainer film layer of a water-insoluble cellulose derivative,

said support film layer being attached to said destroyable retainer film layer with adherance smaller than the adherance of said sticky photoresist layer to said surface of the article body,

said support film layer being adapted to be stripped from the destroyable retainer film layer while maintaining adherance of the destroyable retainer film layer to the photoresist layer,

said destroyable retainer film layer being not sticky and not adherable to said surface and being adapted to be destroyed by sandblasting while said solid portions of the photoresist layer are resistant to sandblasting;

(2) stripping the support film layer from the destroyable retainer film layer;

(3) blowing an abrasive material against the destroyable retainer film layer to destroy said retainer film layer, thereby causing said vacant image portions of the sticky photoresist layer to be exposed;

(4) further blowing an abrasive material through said vacant image portions against the article body to engrave an image corresponding to that of said vacant image portions on the article body; and

(5) removing the solid portions of the photoresist layer to obtain a pattern-engraved article.

4,587,187

PRINTING MEMBER FOR ELECTROSTATIC PHOTOCOPYING

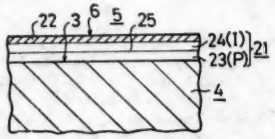
Shunpei Yamazaki, 21-21 Kitakarasuyama 7-chome, Setagaya-ku, Tokyo, Japan

Division of Ser. No. 502,583, Jun. 9, 1983, which is a division of Ser. No. 276,503, Jun. 23, 1981, Pat. No. 4,418,132. This application Mar. 29, 1984, Ser. No. 594,686

Claims priority, application Japan, Jun. 25, 1980, 55-86801

Int. Cl.[4] G03G *5/082, 5/14*

U.S. Cl. 430—57 **6 Claims**



1. A printing member for electrostatic photocopying consisting essentially of:

a substrate having a conductive surface; and a photoelectrically-sensitive, electricaliy chargeable layer on the conductive surface of the substrate;

wherein the photoelectrically-sensitive electrically chargeable layer has a non-single crystalline semiconductor layer on the conductive surface of the substrate and a chargeable layer formed on the non-single-crystalline semiconductor layer;

wherein the non-single-crystalline semiconductor layer has a first layer on the side of the substrate and a second layer on the first layer to create a transition region;

wherein the first layer is P or N type and is formed principally of Si, Si_3N_{4-x} $(0<x<4)$, SiC_{1-x} $(0<x<1)$, or SiO_{2-x} $(0<x<2)$ and contains hydrogen, fluorine, or chlorine, the second layer is I type and is formed principally of SiC_{1-x} $(0<x<1)$ and contains hydrogen, chlorine, or fluorine, and the transition region is PI to NI type depending on whether the first layer is P or N type; and

wherein the energy band gap of the second layer is less than the energy band gap of the chargeable layer

wherein the chargeable layer is formed principally of $Si-O_{2-x}(0<x<2)$, Si_3N_{4-x} $(0<x<4)$ or SiC_{1-x} $(0<x<1)$.

4,587,188

PHTHALOCYANINE PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY

Masakazu Kato; Yoichi Nishioka, and Katsuaki Kaifu, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Aug. 31, 1983, Ser. No. 528,122

Claims priority, application Japan, Sep. 6, 1982, 57-153982; Sep. 6, 1982, 57-153981; Jan. 14, 1983, 58-3297; Jan. 20, 1983, 58-6723; Jan. 21, 1983, 58-7381

Int. Cl.[4] G03G *5/06, 5/14*

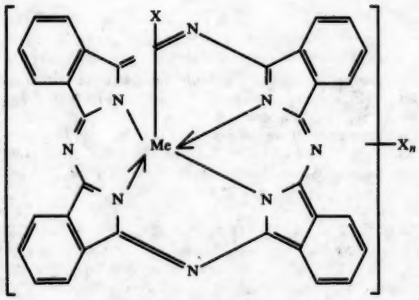
U.S. Cl. 430—58 **7 Claims**

1. In a layered photoconductor for electrophotography, said photoconductor comprising:

a carrier generation layer comprising an organic photoconducting material which absorbs light and generates carriers and

a carrier transport layer which transports said carriers to said carrier generation layer,

the improvement wherein said organic photoconducting material comprises a phthalocyanine having the following formula:



wherein Me is selected from the group consisting of indium and gallium, Me is indium or gallium X is chlorine or bromine, X_n represents the same halogen as X but which is substituted in at least one benzene ring in the phthalocyanine nucleus and n is greater than 0.

4,587,189

PHOTOCONDUCTIVE IMAGING MEMBERS WITH PERYLENE PIGMENT COMPOSITIONS

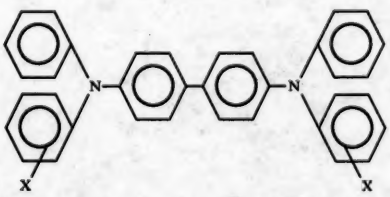
Ah-Mee Hor, Mississauga, and Rafik O. Loutfy, Willowdale, both of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed May 24, 1985, Ser. No. 737,605

Int. Cl.[4] G03G *5/14*

U.S. Cl. 430—59 **24 Claims**

1. An improved layered photoresponsive imaging member comprised of a supporting substrate; a vacuum evaporated photogenerator layer comprised of a perylene pigment selected from the group consisting of a mixture of bisbenzimidazo(2,1-a-1′,2′-b)anthra(2,1,9-def:6,5,10-d′e′f′)diisoquinoline-6,11-dione, and bisbenzimidazo(2,1-a:2′,1′-a)anthra(2,1,9-def:6,5,10-d′e′f′)diisoquinoline-10,21-dione; and N,N′-diphenyl-3,4,9,10-perylenebis(dicarboximide); and an aryl amine hole transport layer comprised of molecules of the following formula:



dispersed in a resinous binder and wherein X is selected from the group consisting of halogen and alkyl.

4,587,190

PHOTOCONDUCTIVE MEMBER COMPRISING AMORPHOUS SILICON-GERMANIUM AND NITROGEN

Keishi Saitoh, Ibaraki; Yukihiko Ohnuki, Kawasaki, and Shigeru Ohno, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 31, 1984, Ser. No. 646,301

Claims priority, application Japan, Sep. 5, 1983, 58-162724; Sep. 6, 1983, 58-163432; Sep. 12, 1983, 58-167745; Sep. 12, 1983, 58-167749; Oct. 14, 1983, 58-191984; Oct. 14, 1983, 58-191988

Int. Cl.[4] G03G *5/02, 5/08*

U.S. Cl. 430—85 **50 Claims**

1. A photoconductive member comprising a substrate and a light receiving layer having photoconductivity which comprises an amorphous material containing silicon atoms, germanium atoms, and at least one of hydrogen atoms and halogen atoms; the germanium atoms being distributed nonuniformly in the layer thickness direction in the light receiving layer and nitrogen atoms being contained in the light receiving layer.

4,587,191

COLLAPSIBLE PHOTORECEPTIVE SHEET INCLUDING A HIGH CONCENTRATION OF VOIDS

Harold E. Clark, Hendersonville, N.C., assignor to Futures C, Inc., Hendersonville, N.C.

Filed Jan. 5, 1984, Ser. No. 568,498

Int. Cl.[4] G03G *13/20*

U.S. Cl. 430—97 **21 Claims**

1. A method of producing an image on a photoreceptive sheet so that said sheet, bearing said image, has the feel essentially of a plain piece of paper, said method comprising

exposing the photoreceptive sheet bearing a photoreceptive layer comprising a microfoam comprising a plurality of voids in a mixture of a photoconductive substance comprising a solids component, and an insulating binder said sheet being further characterized in that the voids to solids volumetric ratio of said photoreceptive layer is at least five to one, to an image to form a latent image,

developing said sheet bearing said latent image to form a visual image, and

treating said sheet to cause the collapse of said voids.

4,587,192

DEVELOPING APPARATUS FOR THE LIQUID DEVELOPMENT OF ELECTROSTATIC CHARGE IMAGES

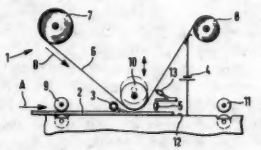
Erwin Lind, Wiesbaden, and Helmuth Haberhauer, Taunusstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 9, 1984, Ser. No. 639,029

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1983, 3329451

Int. Cl.' B05B *5/00*; G03G *13/10, 15/06, 15/10*

U.S. Cl. 430—117 **18 Claims**



1. A developing apparatus for the liquid development of electrostatic charge images on an image carrier material, comprising:

a base over which the image carrier material is transported;

a device for spraying a liquid developer onto the image carrier material to be developed;

a developing electrode connected to a direct-current voltage source, said electrode comprising an electrically conductive web;

means for advancing the conductive web in relation to the image carrier material; and

at least one guide roll means for adjusting the distance between said electrically conductive web and the image carrier material and for passing said electrically conductive web in relation to the image carrier material.

4,587,193

COPYING PROCESS WITH PATTERNED CHARGE INJECTION INTO CHARGE TRANSPORT LAYER

Roelof H. Everhardus, Lomm; Theodorus J. H. Siebers, Horst, and Martinus B. G. M. Biermans, Belfeld, all of Netherlands, assignors to Oce-Nederland, B.V., Ma Venlo, Netherlands

Filed Mar. 20, 1985, Ser. No. 713,873

Claims priority, application Netherlands, Mar. 23, 1984, 8400922

Int. Cl.[4] G03G *13/22, 5/14*

U.S. Cl. 430—126 **6 Claims**

1. A process for producing copies in which:

(a) a charge image with a pattern of charged and uncharged areas superimposed thereon is formed by charging and exposing image-wise an electrophotographic layer and therebeneath a charge-generating layer which upon exposure injects charges into a plurality of first areas of the charge-transporting top layer but does not inject charges into a plurality of second areas of the charge-transporting layer;

(b) the charge image is developed into a powder image with a developing powder having a resistivity of less than 10^{12} ohms-cm; and

(c) the powder image is transferred to a receiving material and is fixed thereon.

4,587,194

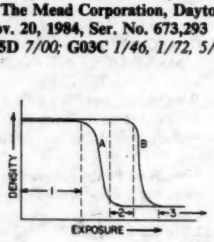
PHOTOSENSITIVE MATERIAL EMPLOYING MICROCAPSULES HAVING DIFFERENT PHOTOGRAPHIC SPEEDS

Paul C. Adair; Chuan Lee, and Frank D. Loel, all of Chillicothe, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Nov. 20, 1984, Ser. No. 673,293

Int. Cl.[4] B05D *7/00*; G03C *1/46, 1/72, 5/00*

U.S. Cl. 430—138 **33 Claims**



1. A photosensitive material useful in forming images of two or more colors comprising a support having first and second photosensitive microcapsules having different film speeds on the surface thereof, said first microcapsules being more sensitive to predetermined actinic radiation than said second microcapsules; each of said first and second microcapsules including photosensitive compositions internal thereof which undergo a change in viscosity upon exposure to said radiation and having first and second image-forming agents respectively associated therewith, said first image-forming agent being different than said second image-forming agent; wherein said photosensitive material is capable of forming images of two or more colors by image-wise exposing said material to said predetermined actinic radiation at two distinct exposure intensities and/or times and subjecting said microcapsules to a uniform rupturing force whereupon said image-forming agents are image-wise released from said microcapsules and two or more image colors are obtained.

4,587,195

METHOD OF PROCESSING SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Masao Ishikawa; Shigeharu Koboshi, and Masayuki Kurematsu, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

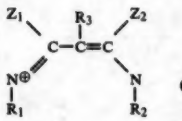
Continuation-in-part of Ser. No. 529,726, Sep. 6, 1983, abandoned. This application Apr. 10, 1985, Ser. No. 721,781

Claims priority, application Japan, Sep. 14, 1982, 57-161523

Int. Cl.[4] G03C *5/16*

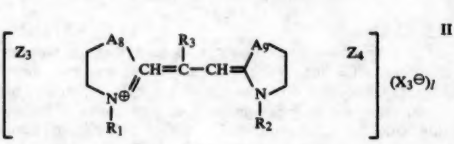
U.S. Cl. 430—139 **9 Claims**

1. A method of processing a silver halide photographic light-sensitive material which comprises exposing imagewise said material to light and thereafter processing said material with a color developer containing at least two kinds of triazylstilbene type brightening agents having maximum fluorescent wavelengths of their respective fluorescent spectra at least 4 mμ apart, wherein the concentration ratio of first brightening agents having shorter maximum fluorescent wavelengths to second brightening agents having maximum fluorescent wavelengths at least 4 mμ greater than said first agent is 5:1 to 1:5; said light-sensitive material comprising a sensitizing dye of Formula I or II and an antiirradiation dye of Formula III, IV, V, or VI



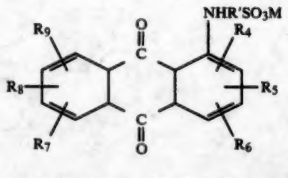
I

wherein Z_1 and Z_2 each is a group of atoms necessary to form a benzoxazole, naphthoxazole, benzothiazole, naphthothiazole, benzoselenazole, naphthoselenazole, benzimidazole, naphthoimidazole, pyridine, or quinonline nucleus; R_1 and R_2 each is a group selected from the class consisting of alkyl, alkenyl, and aryl groups; R_3 is H, methyl or ethyl; X_3^- is an anion; and l is 0 or 1;



II

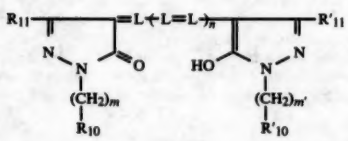
wherein Z_3 and Z_4 each is a group of atoms necessary to form a benzene or naphthalene ring condensed with an oxazole or thiazole ring which may be substituted or unsubstituted; R^1—R^3, X_3^-, and l are defined as in Formula I; and A_8 and A_9 are each oxygen or sulfur;



III

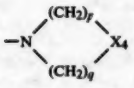
wherein R_4, R_5, R_6, R_7, R_8 and R_9 each is hydrogen, halogen, hydroxy, an alkyl group having from 1 to 4 carbon atoms, an alkoxy group, —SO_3M, or —$NHR'SO_3M$, wherein R' is an

alkylene group and M is a cation of an alkali metal, of ammonium, or of an organic ammonium salt;

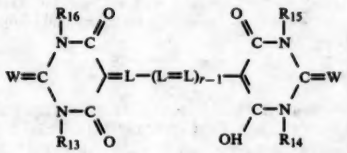


IV

wherein R_{10} and $R_{10'}$ are each H, alkyl, or substituted or unsubstituted aryl or heterocyclic; R_{11} and $R_{11'}$ are each hydroxy, alkoxy, substituted alkoxy, cyano, $-CF_3$, $-COOR_{12}$, $-CONHR_{12}$, $-NHCOR_{12}$, amino, substituted amino, or cyclic amino represented by

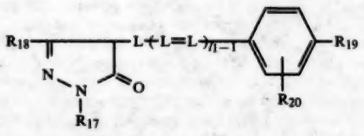


in which R_{12} is H, alkyl, or substituted or unsubstituted aryl, p and q are each 1 or 2, and X_4 is oxygen, sulfur, or $-CH_2-$; L is an unsubstituted or substituted methine; n is 0, 1, or 2; and m and m' are each 0 or 1;



V

wherein r is an integer of 1-3; W is oxygen or sulfur; L is as defined in Formula IV; and R_{13}-R_{16} are independently H, alkyl, substituted alkyl, substituted or unsubstituted aryl, aralkyl, or heterocyclic groups; and



VI

wherein l_1 is 1 or 2; R_{17} is selected from the same group as R_{10} in Formula IV; L is as defined in Formula IV; R_{18} is alkyl group and selected from the same group as R_{11} of Formula IV; R_{19} is $-OZ_5$ or

wherein Z_5-Z_7 are independently H, or alkyl, and Z_6 and Z_7 can combine with each other to form a ring; and R_{20} is H, alkyl, Cl, or alkoxy.

4,587,196

POSITIVE PHOTORESIST WITH CRESOL-FORMALDEHYDE NOVOLAK RESIN AND PHOTOSENSITIVE NAPHTHOQUINONE DIAZIDE

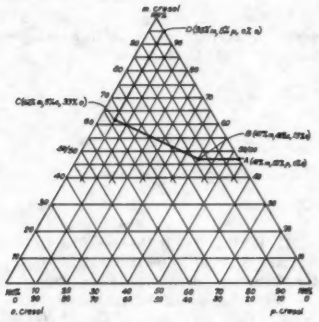
Medhat A. Toukhy, Barrington, R.I., assignor to Philip A. Hunt Chemical Corporation, W. Paterson, N.J.

Continuation of Ser. No. 403,935, Aug. 2, 1982, Pat. No. 4,529,682, which is a continuation-in-part of Ser. No. 275,707, Jun. 22, 1981, abandoned. This application Oct. 31, 1984, Ser. No. 666,743

The portion of the term of this patent subsequent to Mar. 22, 2000, has been disclaimed.

Int. Cl.[4] G03C *1/60, 1/54*

U.S. Cl. 430—192 **9 Claims**



1. A positive photoresist composition comprising an unreacted mixture including 5 to 50 percent by weight of a photosensitive naphthoquinone diazide sulfonyl ester and 50 to 95 percent by weight of a cresol-formaldehyde novolak resin produced by condensing a mixture of cresol isomers with formaldehyde in the presence of acid, said mixture of cresols consisting essentially of percentages by weight of ortho-, meta-, and paracresol whose values are within the area bounded by quadrilateral ABCD in FIG. 1, said resin having a softening point within the range of 110° to 145° C.

4,587,197

FLEXIBLE PHOTOSENSITIVE POLYMER COMPOSITION WITH AZIDE AND/OR AMINE COMPOUND, POLY(AMIC ACID) AND HIGHLY POLAR COMPOUND WITH BOILING POINT ABOVE 150° C.

Mithumasa Kojima, Hitachi; Fumio Kataoka; Fusaji Shoji, both of Yokohama, and Hitoshi Yokono, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Hitachi Chemical Co., Ltd., both of Tokyo, Japan

Filed Feb. 8, 1984, Ser. No. 578,058

Claims priority, application Japan, Mar. 4, 1983, 58-34589

Int. Cl.[4] G03C *1/71, 1/60*

U.S. Cl. 430—196 **14 Claims**

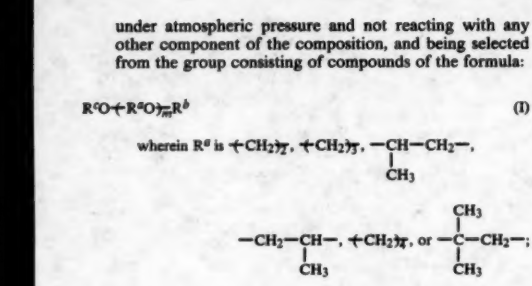
1. A photosensitive polymer composition comprising an admixture of:

(A) 100 parts by weight of a poly(amic acid),

(B) a compound or a mixture of compounds which is photosensitive and which can form a compound having two or more amino groups by irradiation with light selected from the group consisting of (i) a mixture of at least one bisazide in an amount of 0.1 to 100 parts by weight and at least one amine having at least one group of the formula: >C=C< in an amount of 1 to 400 parts by weight and (ii) 1 to 100 parts by weight of at least one amine compound having an aromatic azido group or an aromatic sulfonylazido group, and

(C) 1 to 50 parts by weight of at least one compound with high polarity, having a boiling point of 150° C. or higher

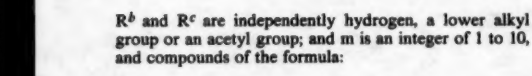
under atmospheric pressure and not reacting with any other component of the composition, and being selected from the group consisting of compounds of the formula:



$$R^cO\text{-}(R^aO)_m\text{-}R^b \quad (I)$$

wherein R^a is $-CH_2)_y$, $-CH_2)_y$, $-CH(CH_3)-CH_2-$, $-CH_2-CH(CH_3)-$, $-CH_2)_x$, or $-C(CH_3)_2-CH_2-$;

R^b and R^c are independently hydrogen, a lower alkyl group or an acetyl group; and m is an integer of 1 to 10, and compounds of the formula:



$$R^bOCH(-CH_2)_nCHOR^c \quad (II)$$

wherein R^b and R^c are as defined above.

4,587,198

DYE TRANSFER IMAGE PROCESS

Richard S. Fisch, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 16, 1984, Ser. No. 631,533
Int. Cl.[4] G03C *5/54, 5/16;* C23C *13/04, 13/02*
U.S. Cl. 430—201 **11 Claims**

1. A process for providing a color image from an imageable article comprising a substrate, a vapor-deposited dye or pigment, and a radiation sensitive layer said process comprising:

(a) exposing said radiation sensitive layer to an imagewise distribution of radiation which alters the solubility and/or permeability of said layer, and

(b) heating said imageable article uniformly to evaporate said dye or pigment at different rates from the article to provide an image

wherein a receptor is in contact with said article and evaporated dye or pigment deposits on a surface of said receptor to form an image, and

wherein said photoresist layer is an organic negative-acting photoresist layer and said heating is performed without etching of the photoresist layer.

2. A process for providing a color image from an imageable article comprising a substrate, a vapor-deposited dye or pigment, and a radiation sensitive layer said process comprising:

(a) exposing said radiation sensitive layer to an imagewise distribution of radiation which alters the solubility and/or permeability of said layer, and

(b) heating said imageable article uniformly to evaporate said dye or pigment at different rates from the article to provide an image

wherein a receptor is in contact with said article and evaporated dye or pigment deposits on a surface of said receptor to form an image, and

wherein said photoresist layer is an organic positive-acting photoresist layer and said heating is performed without etching of the photoresist layer.

4,587,199

CONTROLLED ROUGHENING OF A PHOTOSENSITIVE COMPOSITION

Allyn N. Bennett, Towanda, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 11, 1983, Ser. No. 512,758
Int. Cl.[4] G03C *1/90, 1/60*
U.S. Cl. 430—260 **24 Claims**

1. In a photosensitive element wound in a roll comprising a flexible support bearing at least one layer of a photopolymer composition and a removable cover sheet, said support having greater adhesion than the cover sheet to the photosensitive element and furthermore the support is strippable from the photopolymer composition or transmits actinic radiation, whereby the improvement comprises the cover sheet having a roughened finish on its surface which faces toward the photosensitive composition and whereby the photosensitive composition follows contours of the cover sheet whereby the surface roughness of the photosensitive composition is in an average range of from 2 microns to 11 microns, peak to valley distance.

4,587,200

PHOTOPOLYMERIZABLE COMPOSITION COMPRISING AN ACRIDINE AND A HETEROCYCLIC THIOL COMPOUND AS A PHOTOPOLYMERIZATION INITIATOR AND A PHOTOGRAPHIC PROCESS USING SAID PHOTOPOLYMERIZABLE COMPOSITION

Koji Tamoto, and Akira Umehara, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 5, 1984, Ser. No. 617,436
Claims priority, application Japan, Jun. 6, 1983, 58-100500
Int. Cl.[4] C08F *2/46, 4/00;* G03C *1/68*
U.S. Cl. 430—281 **13 Claims**

1. A photopolymerizable composition comprising (1) a polymerizable compound having at least one ethylenic unsaturated double bond and (2) a photopolymerization initiator, said photopolymerization initiator being present in an amount of 1:5 to 1:1,000 parts by weight of said polymerizable compound having at lest one ethylenic unsaturated double bond and comprising (A) an acridine having a substituted or unsubstituted phenyl group at the 9-position and (B) a heterocyclic thiol compound having a 5- to 7-membered heterocyclic ring containing at least one nitrogen atom with the weight ratio of said acridine compound to said heterocyclic compound being from about 30:1 to 1:30.

4,587,201

PHOTO-CURABLE URETHANE-ACRYLATE RESIN COMPOSITION FOR PERMANENT RESIST

Takao Morikawa, Tougane; Tosio Kobayasi; Masayuki Kataoka, both of Ichihara, and Atsushi Mori, Chiba, all of Japan, assignors to Nippon Soda Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 544,535, Oct. 24, 1983, abandoned.
This application May 20, 1985, Ser. No. 736,522
Claims priority, application Japan, Nov. 5, 1982, 57-193521
Int. Cl.[4] G03C *1/68*
U.S. Cl. 430—284 **2 Claims**

1. A photo-curable resin composition for a permanent resist material which is used in an electroless plating process, said photoc-curable resin composition consisting essentially of a urethane-acrylate resin combined with from 0.05 to 10% by weight, based on the weight of the urethane-acrylate resin, of a photo-polymerization initiator, said urethaneacrylate resin being obtained by a process comprising: reacting component-A, with component-B; said component-A consisting of polyisocyanates obtained through reacting at least 0.8 to not more than 1.2 mol of "urethane prepolymer (a)" as hereinafter defined, with 1.0 equivalent of hydroxy group of "polybutadienepolyols or a mixture thereof with organic hydroxy compounds (b)" as hereinafter defined; said component-B being acrylate or methacrylate having hydroxyl group in the molecule thereof; said "urethane prepolymers (a)" are obtained by

reacting from at least 0.8 to not more than 1.2 moles of diisocyanate compounds with a 1.0 equivalent of active hydrogen provided by at least one multi-functional compound having active hydrogen, to thereby obtain a urethane prepolymer,

said at least one multi-functional compound being selected from the group consisting of glycerin, 1,2,6-hexanetriol, 1,1,1-trimethylol propane, 1,1,1-trimethylolethane, triethanolamine, triisopropanolamine, pentaerythritol and mix-

tures thereof, and said diisocyanate compounds being selected from the group consisting of aliphatic diisocyanates, aromatic diisocyanates and alicyclic diisocyanates; and reacting from at least 0.8 to not more than 1.2 moles of said urethane prepolymer with a 1.0 equivalent of hydroxyl group provided by at least one polybutadienepolyol or a mixture thereof with up to 40% by weight, based on the weight of said mixture, of at least one organic hydroxy compound, with the proviso that no less than the equivalent moles of urethane prepolymer be reacted with the hydroxyl group, to thereby obtain a polyisocyanate, terminated chain extended prepolymer said polybutadienepolyol having a number average molecular weight of from 500 to 5,000, a 1,2-bond in the range of 50% or more of the butadiene unit in the polymer chain, and hydroxy groups at both ends of the polymer chain, said at least one organic hydroxy compound having two or more hydroxyl groups in each molecule thereof and being selected from the group consisting of polyesterpolyols, polyetherpolyols and polyacrylpolyols; and reacting from 0.8 to 1.5 equivalents of hydroxyl group provided by an acrylate or a methacrylate having at least one hydroxyl group in the molecule thereof, with a 1.0 equivalent of isocyanate group in said polyisocyanates, to thereby obtain said urethane-acrylate resin.

4,587,202

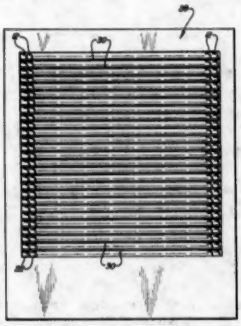
PHOTOETCHING PROCESS FOR MAKING SURGICAL NEEDLES

Emil Borysko, Bridgewater, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed Dec. 14, 1984, Ser. No. 682,046

Int. Cl.[4] G03C *5/00*; B21G *3/18*

U.S. Cl. 430—320 **4 Claims**



1. Process for producing surgical needles which comprises the steps of:

(a) coating at least one side of a metal sheet with a light sensitive photoresist;

(b) exposing the photoresist with light in the image of a plurality of surgical needles each needle having a pointed end and a suture attachment end, wherein said light image includes a plurlaity of continuous strips extending across the full width of said image, and wherein the images of the surgical needle are attached at their suture attachment ends in spaced relationship to said strips:

(c) removing the unexposed photoresist, to thereby leave in place on the metal sheet hardened photoresist in the image of a plurality of surgical needles: and

(d) exposing the product of step (c) to an etchant to remove metal not protected by said hardened photoresist, to thereby form a plurality of surgical needles.

4,587,203

WET PROCESS FOR DEVELOPING STYRENE POLYMER RESISTS FOR SUBMICRON LITHOGRAPHY

Robert G. Brault, Santa Monica, and Leroy J. Miller, Canoga Park, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 491,636, May 5, 1983. This application May 23, 1985, Ser. No. 737,364

Int. Cl.[4] G03C *5/16, 1/74*

U.S. Cl. 430—325 **16 Claims**

1. A process for preparing negative resists on a substrate which includes bonding polymer resins to a siliceous substrate and lithographically preparing a patterned resist on said substrate, which process comprises:

A. forming an article consisting essentially of:

(1) a siliceous substrate;

(2) a layer of silane on a surface of said substrate, which silane is: $R^{i}—(O)_{0\text{-}1}—(R^{ii})_{0\text{-}1}—Si—(R^{iii})_3$ or the hydrolysis products thereof and wherein one or more of the R^{iii} groups are replaced by OH;

where:

R^{i} is acryloyl, methacryloyl, or vinyl, and when R^{i} is vinyl, then the moiety "$(O)_{0\text{-}1}$" is absent;

R^{ii} is alkylene having 2–6 carbon atoms, or $R^{iv}—NH—R^{v}$ where R^{iv} is hydroxyalkylene having 2–6 carbon atoms and R^{v} is alkylene having 2–6 carbon atoms, and when R^{i} is vinyl, R^{ii} is absent;

R^{iii} is halo, or alkoxy having 1–6 carbon atoms, or alkoxyalkoxy having at least 3–6 carbon atoms, or alkanoyloxy having a total of 2–5 carbon atoms, or an alkyl having 1–6 carbon atoms, where the number of said alkyl groups present is not more than 2, and mixtures thereof; and

(3) a polymer resin overlaying said silane, which resin affords free radicals when subjected to radiation and is selected from the group consisting of:

(a) polystyrene,

(b) halogenated polystyrene, and

(c) substituted styrene polymer, where the substituted monomer has at least one substituent selected from the group consisting of alkyl having 1–4 carbon atoms, halo, haloalkyl having 1–4 carbon atoms and at least one halo; and

(d) mixtures thereof;

B. applying said layer of silane to the siliceous substrate, heating the silane-coated surface of the substrate to form a bond between the silane and the substrate, then applying the polymer resin overlay to the silane coated surface, and irradiating the polymer-overlaid surface (1) to generate free radicals at the polymer-silane interface so as to form a bond between the silane and the polymer overlay, so that a substantially unitary article is obtained, and (2) to form a negative pattern image therein; and

C. developing said image by

(i) dissolving away unexposed polymer with a developer solvent, and

(ii) rinsing said wet developed resist with a nonsolvent to eliminate substantially any snakiness of the developed resist pattern image;

where said developer solvent/rinse nonsolvent combination is selected from the following schedule, wherein (d/s) is developer solvent and (r/ns) is rinse nonsolvent:

I.	(d/s)	$R_2—(OCH_2CH_2)_m—O—H$
	(r/ns)	$R_5—(OCH_2CH_2)_m—OH$ or R—OH
II.	(d/s)	$R_7—(OCH_2CH_2)_m—O—R_7$
	(r/ns)	$R_5—(OCH_2CH_2)_m—OH$ or R—OH
III.	(d/s)	$R—CO—(OCH_2CH_2)_p—O—(OC)_{0\text{-}1}—R$
	(r/ns)	$R_5—(OCH_2CH_2)_m—OH$ or R—OH
IV.	(d/s)	benzene, toluene, ethylbenzene, xylene, monochlorobenzene, monochlorotoluene, monochloroethylbenzene, monochloroxylene, ortho-dichlorobenzene, meta-dichlorobenzene, and trichlorobenzene
	(r/ns)	alkane having 5–8 carbon atoms, cyclo-

-continued

		alkane having 5–8 carbon atoms, and petroleum distillate boiling in the 5–8 alkane carbon atom boiling range
V.	(d/s)	dioxane
	(r/ns)	R—OH

where:
R is alkyl having 1–4 carbon atoms,
R_2 is alkyl having 4–8 carbon atoms,
R_5 is H, methyl, or ethyl,
R_7 is alkyl having 1–8 carbon atoms,
m is an integer equal to 1–4, and
p is an integer equal to 1–2.

4,587,204

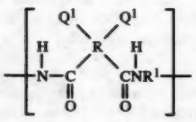
PHOTOPATTERNABLE DIELECTRIC COMPOSITIONS, METHOD FOR MAKING AND USE

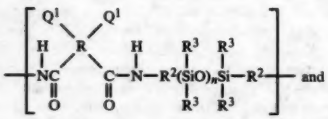
Gary C. Davis, Albany, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 527,581, Aug. 29, 1983, Pat. No. 4,515,887. This application Jan. 28, 1985, Ser. No. 695,601
Int. Cl.[4] G03C 5/16; G03F 7/26
U.S. Cl. 430—325 **1 Claim**

1. A method for patterning an insulative silicone-aromatic polyimide layer onto a substrate, which comprises

(1) spin coating onto a substrate under substantially light-free conditions, a photoresist composition comprising an organic solvent solution of a modified silicone-aromatic polyamide acid having at least 10 mole percent of nuclear bound acrylate amide groups, based on the total moles of the carboxy groups and nuclear bound acrylate amide groups in the modified silicone-aromatic polyamide acid consisting essentially of chemically combined units of the formulas





and

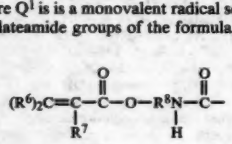
(2) allowing the spin coated photosensitive silicone-polyamide acid of (1) to dry,

(3) exposing the treated substrate while it is masked for a time sufficient to cross-link the nuclear bound acrylate amide groups of the modified silicone-polyamide acid,

(4) developing the resulting modified silicon-aromatic polyamide acid treated substrate, and

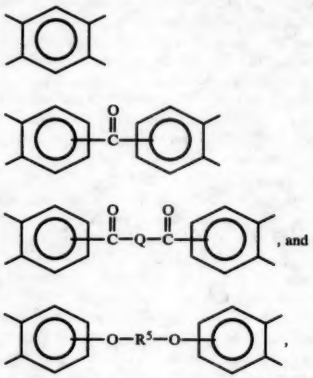
(5) heating the developed modified silicone-aromatic polyamide acid treated substrate at a temperature sufficient to convert aromatic polyamide acid to aromatic polyimide,

where Q^1 is is a monovalent radical selected from carboxy and acrylateamide groups of the formula,



(5)

and there are at least 10 mole percent of acrylateamide groups based on the total carboxy and acrylateamide groups in the silicone-aromatic polyamide, where R is a tetravalent $C_{(6-30)}$ aromatic radical selected from the class consisting of



, and

R^1 is a divalent $C_{(2-13)}$ organic radical, R^2 is a divalent $C_{(2-8)}$ organic radical, R^3 is selected from the class consisting of $C_{(1-13)}$ monovalent hydrocarbon radicals and substituted $C_{(1-13)}$ monovalent hydrocarbon radicals, Q is a divalent radical having the formula,

$$-ZR^4Z-,$$

Z is selected from —O— and —NH—, R^4 and R^5 are $C_{(2-13)}$ organic radicals, R^6 and R^7 are selected from the group consisting of the class consisting of hydrogen and $C_{(1-8)}$ alkyl radicals, R^8 is a $C_{(1-13)}$ divalent organo radical and n is an integer equal to 1 to 20 inclusive.

4,587,205

METHOD OF USING POLYSILANE POSITIVE PHOTORESIST MATERIALS

Larry A. Harrah, and John M. Zeigler, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Division of Ser. No. 597,005, Apr. 5, 1984. This application Nov. 29, 1984, Ser. No. 676,148
Int. Cl.[4] G03C 5/00
U.S. Cl. 430—326 **16 Claims**

1. A method of photopatterning a positive image onto a substrate coated with a polysilane, comprising irradiating the coated substrate with actinic radiation forming a pattern of said positive image on the substrate, whereby the portions of the polysilane coating on which said radiation impinges are photodepolymerized to form products which volatilize and whereby said substrate becomes uncoated in the pattern of said positive image,

wherein said polysilane is a homopolymer which is substantially free of low molecular weight oligomers or cyclic materials and which comprises recurring units of —Si(X-)(Y)—, wherein X and Y together have 4 to 13 carbon atoms, and X and Y each independently is hydrogen, alkyl, cycloalkyl, substituted phenyl, 1- or 2-naphthyl, or phenylalkyl, or togehter X and Y are an alkylene group forming a ring with the adjoining Si atom, wherein X and Y groups which are not H can be substituted by one of C_{1-6}-alkoxy, mono- or di(C_{1-3}-alkyl)amino, C_{2-6}-alkanoyl or the corresponding C_{2-3}-ketal thereof, C_{1-6}-alkyl, $—NH_2$ or —OH; with the proviso that only one of X and Y can be a substituted phenyl, and wherein, as a result of the selection of X and Y, said polysilane has sufficient photosensitivity to depolymerize upon exposure to actinic radiation, forming products which volatilize; or

wherein said polysilane is a copolymer comprising recurring units of —Si(X)(Y)—, and Si(A)(B)—, Si(X)(Y)— being different from Si(A)(B)—,

wherein X and Y together have 1 to 13 carbon atoms, and X and Y each independently is hydrogen, alkyl, cycloalkyl, phenyl, alkylphenyl, or phenylalkyl, with the proviso that only one of X and Y contains a phenyl moiety, or together X and Y are an alkylene group forming a ring with the adjoining Si atom,

and wherein A and B together have 3 to 13 carbon atoms, and A and B each independently is alkyl, 1- or 2-naphthyl, or cycloalkyl, wherein X, Y, A, or B groups which are not H can be substituted by one of C_{1-6}-alkoxy, mono- or di-(C_{1-3}-alkyl)amino, C_{2-6}-alkanoyl or the corresponding C_{2-3}-ketal thereof, C_{1-6}-alkyl, —NH_2, or —OH;

with the proviso (a) that when one of A and B is ethyl, the other is not methyl or ethyl, and (b) that when one of A and B is n-propyl and the other is methyl, X and Y are not both methyl,

wherein A and B are substituents imparting sufficient steric hindrance to the copolymer that it photodepolymerizes upon exposure to actinic radiation, and wherein X and Y are substituents of sufficiently low weight that the products of said photodepolymerization volatilize at the instantaneous temperature of the depolymerizing polymer during irradiation;

and wherein said substituents in homo- or copolymers are such that the polymer undergoes substantially no self-crosslinking upon exposure to actinic radiation.

4,587,206

METHOD FOR FORMING IMAGES

Yukihiko Sakaguchi; Toshiaki Aono, and Shinsaku Fujita, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 29, 1984, Ser. No. 594,634

Claims priority, application Japan, Mar. 30, 1983, 58-54168

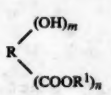
Int. Cl.[4] G03C *1/02*

U.S. Cl. 430—348 **20 Claims**

1. A method for forming an image which comprises:

imagewise exposing to light a heat developable color light-sensitive material comprising a support having thereon at least a light-sensitive silver halide, a binder and a dye releasing redox compound capable of reducing the silver halide and releasing a hydrophilic dye by reacting with the silver halide when heated; and

heating the heat developable color light-sensitive material, after or simultaneously with the imagewise exposing, in the presence of a compound represented by the general formula (A) in a substantially water-free condition to form a mobile dye in an image pattern:



(A)

wherein R is an aliphatic hydrocarbon having a valence of m+n, R^1 is an aliphatic or aromatic group, and m and n each is an integer of 1 to 5, said compound represented by general formula (A) being present in an amount sufficient to improve the storage stability of the light-sensitive material.

12. A heat developable color light-sensitive material, comprising:

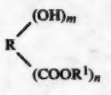
a support having thereon;

a light-sensitive silver halide;

a binder

a dye releasing redox compound which is reductive to the light-sensitive silver halide and releases a hydrophilic dye by causing a reaction with the light-sensitive silver halide by heating; and

a compound represented by the general formula (A):



(A)

wherein R is an aliphatic hydrocarbon having a valence of m+n, R^1 is an aliphatic or aromatic group, and m and n each is an integer of 1 to 5, said compound represented by general formula (A) being present in an amount sufficient to improve the storage stability of the light-sensitive material.

4,587,207

COLOR IMAGE-FORMING PROCESS

Momotoshi Tsuda, and Jun Arakawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 26, 1984, Ser. No. 654,446

Claims priority, application Japan, Sep. 27, 1983, 58-178755

Int. Cl.[4] G03C *7/16*

U.S. Cl. 430—389 **7 Claims**

1. A color image-forming process comprising developing an exposed silver halide light-sensitive material with an aromatic primary amine color developing agent in the presence of an α-acyl-α-unsubstituted or substituted phenoxyacetanilide type yellow coupler having a sulfamoyl group in a m-position of the acetanilido group with respect to the amino group, which sulfamoyl group is represented by the formula SO_2NHZ where Z represents an alkyl group or an aryl group.

4,587,208

COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Takashi Kadowaki, and Kaoru Onodera, both of Odawara, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan

Continuation of Ser. No. 498,742, May 27, 1983, abandoned. This application Apr. 25, 1985, Ser. No. 727,187

Claims priority, application Japan, Jun. 2, 1982, 57-95145

Int. Cl.[4] G03C *1/46*

U.S. Cl. 430—507 **19 Claims**

1. A color photographic light-sensitive material comprising a reflective support having thereon a plurality of silver halide emulsion layers of which the silver halide emulsion layer located farthest from the support contains not less than 15 mole % of silver chloride, said silver halide emulsion layer farthest from the support having on the side opposite to the support side thereof a first nonlight-sensitive layer, said first nonlight-sensitive layer containing an ultraviolet absorbing agent whose ratio A_1/A_2 of the spectral absorption coefficient A_1 at 350 nm to the spectral absorption coefficient A_2 at 400 nm is not less than 10, and a second nonlight-sensitive layer being located between said silver halide emulsion layer farthest from the support and the silver halide emulsion layer second to the farthest from the support, the second nonlight-sensitive layer containing an ultraviolet absorbing agent whose ratio A_1/A_2 of the special absorption coefficient A_1 at 350 nm to the spectral absorption coefficient A_2 at 400 nm is not less than 10.

4,587,209

OPTICAL INFORMATION RECORDING MEMBER COMPRISING AU, TeO_2 AND TE

Eiji Ohno, Neyagawa; Kunio Kimura; Noboru Yamada, both of Hirakata, and Nobuo Akahira, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 25, 1985, Ser. No. 715,395

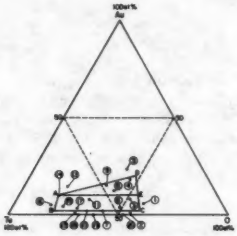
Claims priority, application Japan, Mar. 28, 1984, 59-61463; Jun. 14, 1984, 59-122370

Int. Cl.[4] G03C *1/72, 1/94*

U.S. Cl. 430—526 **9 Claims**

4. An optical information recording member comprising an optical recording thin film comprising at least Te and O in a mixture of TeO_2 and Te and Au, and a thermal diffusion layer

made of a metal and formed on at least one side of said recording thin film.



5. An optical information recording member according to claim 4, wherein said thermal diffusion layer is made of a metal selected from a group consisting of Au, Al, Ni and Pd.

4,587,210

COLOR PHOTOGRAPHIC SILVER HALIDE LIGHT-SENSITIVE MATERIAL CONSISTING OF A SPECIFIED HYDROQUINONE DERIVATIVE

Michio Ono; Masakazu Morigaki; Takayoshi Kamio; Kozo Aoki, and Kazuhiko Furuya, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 30, 1984, Ser. No. 595,195

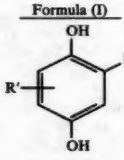
Claims priority, application Japan, Mar. 31, 1983, 58-55699

Int. Cl.[4] G03C *1/08, 7/26, 7/32*

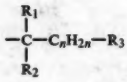
U.S. Cl. 430—555 **14 Claims**

1. A color photographic silver halide light-sensitive material characterized by containing at least one compound selected from the group consisting of a hydroquinone compound represented by the general formula (I) and precursors thereof.

Formula (I)



wherein R represents



(wherein R_1 and R_2 are each a hydrogen atom or an alkyl group and may combine with R_3 to form a ring having 5 to 10 carbon atoms, provided that R_1 and R_2 are not hydrogen atoms at the same time, and R_3 is a substituted or unsubstituted aryl group, and n is an integer of 1 to 4), and R' has 1 to 20 carbon atoms and represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aryl group, or R.

4,587,211

PHOTOTHERMOGRAPHIC STABILIZERS FOR SYRINGALDAZINE LEUCO DYES

Takuzo Ishida, Woodbury, and David C. Weigel, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 1, 1985, Ser. No. 697,279

Int. Cl.[4] G03C *1/02*

U.S. Cl. 430—619 **13 Claims**

1. In a color forming photosensitive, heat-developable, dry silver sheet material comprising a binder, a photosensitive silver halide catalyst-forming means and, as heat sensitive image forming means, a light insensitive organic silver compound and a color forming leuco dye reducing agent therefor, the improvement characterized by said leuco dye being a syringaldazine and said binder comprising a color image stabilizing amount of a resin selected from the group consisting of polymers and copolymer of poly(vinyl chloride) and poly(-vinylidene chloride.)

4,587,212

IMMUNOASSAY

Terence S. Baker, Staines, England, assignor to Boots-Celltech Diagnostics Limited, Slough, United Kingdom

Filed May 18, 1983, Ser. No. 495,601

Claims priority, application United Kingdom, May 26, 1982, 8215462

Int. Cl.[4] G01N *33/53, 33/542;* **C12Q** *1/38*

U.S. Cl. 435—7 **12 Claims**

1. In an enzyme immunoassay for measuring the concentration of an antigenic analyte in a milk sample wherein the enzyme labeled binding partner is introduced to said milk sample and wherein enzyme activity provides a measure of analyte concentration, the improvement wherein the enzyme is an enzyme capable of clotting milk and the substrate for the enzyme forms at least part of the milk sample.

4,587,213

METHODS AND MEANS OF DETERMINING MICROORGANISM POPULATION

George J. Malecki, P.O. Box 647, St. Augustine, Fla. 32085

Continuation-in-part of Ser. No. 401,379, Dec. 23, 1953, abandoned, and a continuation-in-part of Ser. No. 252,600, Jan. 21, 1963, abandoned, and a continuation-in-part of Ser. No. 516,827, Nov., 1965, abandoned, and a continuation-in-part of Ser. No. 77,881, Oct. 3, 1970, abandoned, and a continuation-in-part of Ser. No. 711,057, Aug. 2, 1976, abandoned, and a continuation-in-part of Ser. No. 886,841, Mar. 29, 1978, abandoned. This application Apr. 9, 1981, Ser. No. 214,637

Claims priority, application United Kingdom, Sep. 29, 1971, 45337/71

Int. Cl.[4] C12Q *1/06, 1/08;* **C12M** *1/26, 1/20*

U.S. Cl. 435—39 **11 Claims**

1. The method of estimating a bacterial population which comprises (a) uniformly coating one surface of a transparent microscope slide with a film of a liquid dispersion of a nutrient for said bacteria and a hydrophilic polymer in an amount to form when dried a substantially uniform layer adhering strongly to the surface of the slide, (b) drying the said film at a temperature of between −195° C. to 100° C., (c) evenly spreading a measured volume of an aqueous dispersion of a bacteria and nutrient containing material to be examined directly onto the surface of the dried film, (d) allowing the water of said aqueous dispersion to be imbibed by the said dried film whereby the bacterial content of said material is deposited directly onto the surface of the film, (e) incubating the slide containing the bacterial deposit to accelerate the growth of colonies thereof, and then (f) estimating the bacterial population.

4,587,214

PROCESS FOR PREPARATION OF ASPARTYLPHENYLALANINE ALKYL ESTERS

Tuneo Harada; Hisao Takemoto, both of Shinnanyo, and Tatsuo Igarashi, Tokuyama, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

Filed Aug. 3, 1983, Ser. No. 520,129
Claims priority, application Japan, Aug. 6, 1982, 57-136332
Int. Cl.[4] C12P *21/00, 21/02;* C12N *9/52;* C12R *1/40*
U.S. Cl. 435—70 12 Claims

1. A process for preparing an aspartylphenylalanine alkyl ester comprising the steps of:

(1) contacting a substrate comprising fumaric acid, ammonia and an L-phenylalanine lower alkyl ester each present in an amount of at least about 1% by weight to saturation, with a liquid culture, cells or a lytic product of cells of a microorganism having the identifying characteristics of *Pseudomonas putida,* TS-15001 (FERM BP 159), and which is capable of producing an α-L-aspartyl-L-phenylalanine lower alkyl ester, in which the concentration of the cells or the treated product thereof is in the range of about 10 to about 1,000 g of wet cells based on the molarity of the substrate which is present in the lowest concentration, said contacting being at a temperature in the range of about 10° C. to about 50° C., at a pH in the range of about 4 to about 7, for a period of time sufficient to prepare the desired aspartylphenylalanine ester, and thereafter

(2) recovering the α-L-aspartyl-L-phenylalanine lower alkyl ester from the reaction mixture.

4,587,215

HIGHLY THERMOSTABLE AMYLOGLUCOSIDASE

Jody K. Hirsh, Glenview, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jun. 25, 1984, Ser. No. 624,448
Int. Cl.[4] C12P *19/20;* C12N *9/34;* C12R *1/645*
U.S. Cl. 435—96 7 Claims

5. A thermostable amyloglucosidase elaborated by microorganisms of the species *Talaromyces thermophilus* when grown in a nutrient medium, said amyloglucosidase exhibiting a biphasic decay at 70° C. and pH 5 in the absence of substrate with a half-life of first phase decay of about 18 minutes and no measurable second phase decay for the next hour, with retention of at least about 60% of its original activity after the first phase decay, with an electrophoretic relative mobility of about 0.63 using a polyacrylamide gel at pH 8.3, and having maximum enzymatic activity at about pH 5.1 and 90% of its maximum activity in the pH range from about 4.4 to about 6.0.

4,587,216

MICROBIOLOGICAL OXIDATION REACTIONS USING PURIFIED MONOOXYGENASE ENZYME COMPONENTS

Ramesh N. Patel, Edison, and Leonard E. Mortenson, Lebanon, both of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Aug. 31, 1983, Ser. No. 528,108
Int. Cl.[4] C12P *17/02, 7/26, 7/22, 7/04;* C12N *9/02*
U.S. Cl. 435—123 15 Claims

1. A purified hydroxylase component A of a methane monooxygenase enzyme characterized by having an average molecular weight of about 222,500±10,000 and by having three subunits with average molecular weights as estimated by polyacrylamide gel-electrophoresis in the presence of sodium dodecyl sulfate of about 58,000±5,000; 38,000±3,000; and 18,000±2,000 and by containing about 2.8±0.3 moles of iron per mole of protein wherein said component is isolated from a soluble extract of a methylotrophic strain selected from the group consisting of *Methylobacterium organophilum* XX (ATCC 27,886), *Methylosinus trichosporium* OB3b (NRRL B-11,196), Methylococcus sp. (CRL.25) (NRRL B-11,221), Methylosinus sp. (CRL.16) (NRRL B-11,203) and *Methylobacterium organophilum* (CRL.26) (NRRL B-11,222).

4,587,217

VICINAL HETEROGENEOUS DIHALOGENATED PRODUCTS AND METHOD

John Geigert, Clayton, and Saul L. Neidleman, Oakland, both of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 364,920, Apr. 2, 1982, abandoned. This application May 7, 1984, Ser. No. 607,723
The portion of the term of this patent subsequent to Jan. 17, 2001, has been disclaimed.
Int. Cl.[4] C12P *7/34;* C12N *9/08, 9/02;* C12R *1/645*
U.S. Cl. 435—155 19 Claims

1. A method of making a vicinal dihalogenated product having adjacent bound carbons bound to different halogens from an alkene or alkyne which comprises (a) reacting the alkene or alkyne in an aqueous solution which includes (i) salts of at least two different halides; (ii) an oxidizing agent; and (iii) a halogenating enzyme selected from the group consisting of

chloroperoxidase from *Caldariomyces fumago;*
myeloperoxidase from leukocytes;
lactoperoxidase from milk;
bromoperoxidase from algae;
thyroid peroxidase; and
horseradish peroxidase;

provided that: if the enzyme is lactoperoxidase or bromoperoxidase, at least one of the halides is one with a standard oxidation potential higher than that of chloride; and, if the enzyme is thyroid peroxidase or horseradish peroxidase, at least one of the halides is one with a standard oxidation potential higher than that of bromide and (b) recovering a vicinial dihalogenated product having adjacent bound carbon bound to different halogens.

4,587,218

NOVEL BIOCONVERTING MICROORGANISMS

Charles L. Hershberger, New Palestine, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 21, 1983, Ser. No. 544,337
Int. Cl.[4] C12N *1/20;* C12P *21/00, 21/02;* C12R *1/045*
U.S. Cl. 435—253 4 Claims

1. A biologically pure culture of *Actinoplanes missouriensis* NRRL 15646, or a variant or mutant thereof which, when cultured together with *Actinoplanes missouriensis* NRRL 15647, cosynthesizes antibiotic CUC/CSV.

4,587,219

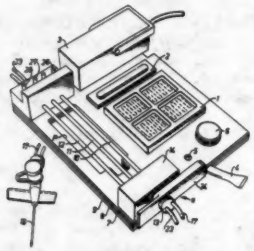
DEVICE FOR MEASURING CONCENTRATION INCLUDING VALVE MEANS

Jan S. Claren, and Lars-Goran Olsson, both of Lund, Sweden, assignors to Gambro Lundia AB, Sweden

Filed Jun. 7, 1983, Ser. No. 501,807
Claims priority, application Sweden, Jun. 15, 1982, 8203696
Int. Cl.[4] C12M *1/40, 1/34, 1/12;* B01L *11/00*
U.S. Cl. 435—288 17 Claims

1. A device for measuring the concentration of a component of a complex medium, comprising a dialyzer for separating at least a portion of said component into the dialysate from said complex medium, means for measuring the concentration of said component in said dialysate, and valve means having a measurement position and calibration position for alternatingly directing the complex medium and a calibration solution, respectively, through a common outlet channel to the dialyzer, said valve means comprising a movable valve part including an openable and closable first inlet channel for the complex medium, said movable valve part being movable between two positions corresponding to said measurement position and said calibration position, a fixed valve part including an openable and closable second inlet channel for the calibration solution, and said common outlet channel so that a calibration of the measuring means can be achieved at intervals between mea-

surements, said dialyzer being in fluid communication with said measuring means so that the dialysate from the dialyzer is



directed to said measuring means for measuring the concentration of said component in said dialysate.

4,587,220

ASCORBATE INTERFERENCE-RESISTANT COMPOSITION, DEVICE AND METHOD FOR THE DETERMINATION OF PEROXIDATIVELY ACTIVE SUBSTANCES

Christine Mayambala-Mwanika, Mishawaka, and Rodric H. White-Stevens, Middlebury, both of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

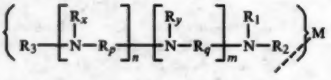
Continuation-in-part of Ser. No. 479,126, Mar. 28, 1983, abandoned. This application Feb. 2, 1984, Ser. No. 575,725

Int. Cl.[4] G01N *33/52;* **C12Q** *1/28*

U.S. Cl. 436—66 **23 Claims**

1. In a composition for detecting the presence of a peroxidatively active substance in a test sample, the composition comprising an organic hydroperoxide and an indicator capable of providing a detectable response in the presence of the peroxidatively active substance and peroxide,

the improvement wherein the composition additionally comprises a metal chelate of a polycarboxyalkylamine derivative having a general formula:



where:

(a) R_1 is hydrogen or straight or branched chain alkyl alcohol or alkyl carboxylic acid radicals having from 2 to 3 carbon atoms; R_2, R_3, R_x and R_y, same or different, are straight or branched chain alkyl alcohol or alkyl carboxylic acid radicals having from 2 to 3 carbon atoms; where at least two of R_1, R_2, R_3, R_x or R_y are alkyl carboxylic acid radicals so defined;

(b) R_p and R_q, same or different, are straight or branched chain alkylene radicals having from 1 to 3 carbon atoms or divalent 1,2-cycloaliphatic radicals having from 6 to 9 carbon atoms;

(c) n is an integer having a value of from 0 to 1; m is an integer having a value of from 0 to 2; where if m is greater than 0, repeated R_p and repeated R_q radicals may be the same or different; and

(d) M is Fe^{+3}.

4,587,221

NON-CENTRIFUGATION METHOD FOR IMMUNOASSAY OF MATERIALS

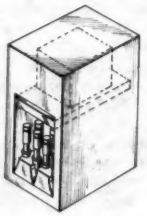
Michael Cais, and Moshe Shimoni, both of Haifa, Israel, assignors to Technion Research & Development Foundation, Ltd., Technion City, Israel

Division of Ser. No. 393,397, Jun. 29, 1982. This application Dec. 30, 1983, Ser. No. 567,003

Claims priority, application Israel, Jul. 20, 1981, 63363

Int. Cl.[4] G01N *33/53, 33/536, 33/537;* **B01D** *33/00*

U.S. Cl. 436—500 **19 Claims**



1. A method for carrying out an immunoassay with a mass transport operation of one or more components from one phase to another phase, and with a subsequent separation of an upper liquid phase, wherein the mass transport and separation are carried out in the same device, said method being carried out in a device comprising

a vertical mixing reservoir; a mixer-separator snuggly fitted into said reservoir for sliding movement therein and having at least one channel passing axially therethrough, said mixer-separator including at its lower end a barrier which is selectively permeable to the upper liquid phase in said mixing reservoir and at its upper end a container into which opens said at least one channel for accumulating the separated liquid from said upper liquid phase from the mixing reservoir forced through said barrier and said channel as said mixer-separator is pushed into said mixing reservoir;

a sealing element surrounding said mixer-separator at a preselected distance above the lower end of said mixer-separator and above said barrier; and

means defining a space positioned in the axial direction between said barrier and said sealing element, for providing a gas cushion for decreasing the pressure exerted on said barrier in response to pushing of said mixer-separator into said mixing reservoir, the configuration of said space and the gas cushion being selected so as to force back into said mixing reservoir any of the upper liquid phase which has crept up along the inner wall of the mixing reservoir above the lower end of the mixer-separator, whereby substantially quantitative separation of the upper liquid phase can be accomplished, said method comprising the steps of:

(a) arranging a plurality of the mixing reservoirs in a rack designed to hold a number of said mixing reservoirs;

(b) introducing a reagent and analyte into each of said mixing reservoirs;

(c) capping each of said mixing reservoirs with one of said mixer-separator means;

(d) allowing the reagents and analytes to incubate for a required period of time in the mixing reservoirs capped with the mixer-separator means;

(e) placing the rack carrying the capped devices with the incubated reagents and analytes into a press-device designed to perform at a controlled rate a downward movement whereby the mixer-separator means are pushed downwardly into the mixing reservoirs at a chosen rate and for a preselected distance sufficient to complete the desired mass-transport and separation operations;

(f) operating the downward movement of said press-device at the preselected rate and distance sufficient to separate the phase which passes through said barrier from the phase which cannot pass through said barrier;
(g) removing the rack upon the disengagement of the press-device; and
(h) placing the separator devices into the desired analytical instrument for a quantitative or qualitative measurement of either one, or both, of the separated phases.

4,587,222

REAGENT COMPRISING TREATED RED BLOOD CELLS AND METHODS FOR DETECTING RHEUMATOID FACTOR

René Guffroy, La Madeleine, France, assignor to Laboratories Polypharma, France

Continuation of Ser. No. 234,559, Feb. 13, 1981, abandoned. This application Jul. 1, 1982, Ser. No. 394,151
Claims priority, application France, Feb. 15, 1980, 80 03440
Int. Cl.[4] G01N *33/555, 33/556, 33/564*
U.S. Cl. 436—509 18 Claims

1. Reagent for the detection of the rheumatoid factor in tests carried out in tubes or in microplates comprising an antigen-antibody complex formed from red blood cells and from antibodies against said red blood cells, said red blood cells and antibodies being immunologically fixed to each other, and said complex forming a sediment in the form of a narrow button at the tip of a tube or microtube of a microplate, when said tube or microtube terminates in a conical bottom, when said reagent is contacted in said tube or microtube with a serum free of rheumatoid factor and undergoing pattern agglutination when contacted with detectable concentrations of rheumatoid factor.

4,587,223

METHOD FOR QUANTITATIVE DETERMINATION OF A BIOSPECIFIC AFFINITY REACTION

Erkki Soini; Ilkka Hemmilä , and Timo Lövgren, all of Turku, Finland, assignors to Wallac Oy, Turku, Finland

Filed Aug. 25, 1983, Ser. No. 526,331
Claims priority, application Sweden, Sep. 13, 1982, 8205211
The portion of the term of this patent subsequent to Feb. 15, 2000, has been disclaimed.
Int. Cl.[4] G01N *33/536, 21/76, 33/566, 33/533*
U.S. Cl. 436—536 2 Claims

1. Method for quantitative determination of a homogeneous immunological reaction, comprising reacting a labelled immunochemical compound with its immunochemical counterpart, labelling the immunochemical compound with a europium or terbium chelate, wherein the improvement comprises measuring the intensity and/or the half-life of the fluorescence of the chelate by excitation of the chelate with a light pulse, and detection of the fluorescence after a predetermined time has elapsed from that light pulse.

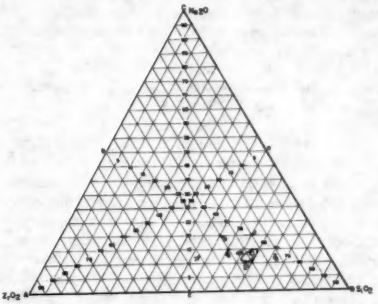
4,587,224

GLASS CERAMIC TOUGHENED WITH TETRAGONAL ZIRCONIA

Keith D. Keefer, Albuquerque, and Terry A. Michalske, Sandia Park, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 10, 1984, Ser. No. 578,898
Int. Cl.[4] C03C *10/02, 10/04, 10/14*
U.S. Cl. 501—4 2 Claims

1. A glass-ceramic composition consisting of, in its original melt and on a weight basis, about 57 parts SiO_2, about 21 parts ZrO_2, about 5 parts Li_2O, and about 17 part B_2O_3; wherein the



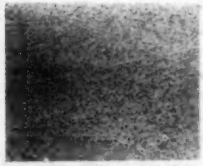
ZrO_2 in the finished glass-ceramic is present in metastable tetragonal form.

4,587,225

HIGH-STRENGTH ZIRCONIA TYPE SINTERED BODY

Koji Tsukuma, Atsugi; Kuniyoshi Ueda, Machida, and Takaaki Tsukidate, Hino, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

Filed Oct. 17, 1984, Ser. No. 661,968
Claims priority, application Japan, Oct. 17, 1983, 58-192470; Apr. 12, 1984, 59-71829; Apr. 25, 1984, 59-82019; May 7, 1984, 59-89272
Int. Cl.[4] C04B *35/48*
U.S. Cl. 501—105 2 Claims



X 2000

1. A hot isostatically pressed zirconia type sintered body consisting essentially of 50 to 98% by weight of ziroconia (ZrO_2) containing 1.5 to 5 mole % of yttria (Y_2O_3) and 50 to 2% by weight of alumina (Al_2O_3), spinel ($MgAl_2O_4$) or mullite ($3Al_2O_3 \cdot 2SiO_2$), said hot isostatically pressed sintered body having a three-point bending strength of at least 1700 MPa,
the crystal phase of zirconia constituting the sintered body being substantially composed of a tetragonal crystal or a mixture of at least 50% of a tetragonal crystal and up to 50% of a cubic crystal,
said sintered body having having a bulk density of at least 99.5% of the theoretical density and devoid of pores having a size of 30 μm or more, and
the crystal of said sintered body having an average grain size of not larger than 2 μm.

4,587,226

PROCESS FOR PRODUCING ANTIMONY-CONTAINING OXIDE CATALYST WITH IMPROVED STRENGTH

Yutaka Sasaki; Toshio Nakamura; Hiroshi Yamamoto; Hiroshi Murata; Yoshimi Nakamura, and Naohiro Takahashi, all of Kanagawa, Japan, assignors to Niito Chemical Industry Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1985, Ser. No. 699,056
Claims priority, application Japan, Feb. 7, 1984, 59-19368
Int. Cl.[4] B01J *37/34*
U.S. Cl. 502—5 5 Claims

1. In a process for producing an antimony-containing oxide catalyst with improved strength by the steps of preparing a slurry containing an antimony compound, a polyvalent metal compound and a silica sol as the essential ingredients, adjusting the pH of the slurry to 7 or less, heat treating the slurry at a temperature of 40° C. or higher, and thereafter drying the slurry and calcining the dried particles, the improvement wherein said slurry is irradiated with ultrasonic waves during the pH adjustment, or after the pH adjustment and before completion of the heat treatment

wherein the drying of the slurry is performed by spray drying so as to form fine spherical particles, which are subsequently calcined at 200°–600° C., and finally calcined at 400°–950° C., the polyvalent metal compound is a compound of at least one element selected from the group consisting of iron, cobalt, nickel, tin, uranium, chromium, copper, manganese, titanium, vanadium, molybdenum, tungsten, tellurium, bismuth, arsenic, thorium, and cerium, and the slurry is irradiated with ultrasonic waves having a frequency range of from 10 to 100 kHz.

4,587,227

ETHYLENE POLYMERS AND CHROMIUM CATALYSTS

Paul D. Smith, and Eric T. Hsieh, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 13, 1984, Ser. No. 640,062
Int. Cl.[4] C08F *4/78*
U.S. Cl. 502—153 13 Claims

1. Process to produce an olefin polymerization catalyst comprising contacting a solid inorganic oxide support and a chromium compound have the formula

$$Cr_n(R)_{2n}$$

wherein

n is an integer of 3 or more;

R is a ligand having the formula

$$-CH_2-MR^1R^2R^3$$

wherein

M is C, Si, Ge, Sn or Pb;

R^1, R^2, R^3, which can be the same or different, are hydrocarbyl substituents consisting of carbon and hydrogen atoms.

4,587,228

MOLDED IRON CATALYST MATERIAL AND ITS PREPARATION

Gerhard Frank, Hirschberg, and Gerald Neubauer, Weinheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 25, 1985, Ser. No. 694,778
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1984, 3402734
The portion of the term of this patent subsequent to Jun. 4, 2002, has been disclaimed.
Int. Cl.[4] B01J *23/74, 27/20*
U.S. Cl. 502—185 8 Claims

1. A molded iron catalyst material having an indentation hardness of from 850 to 1500 kp/cm^2 and containing metallic iron particles, obtained from ion oxide particles by contact with hydrogen at $\leqq$500° C., and a lubricant.

4,587,229

CATALYST FOR THE PRODUCTION OF ALLYL ACETATE

Charles A. Drake, Nowata, and Stephen E. Reiter, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 22, 1984, Ser. No. 663,629
Int. Cl.[4] B01J *23/58, 23/64, 21/08*
U.S. Cl. 502—243 6 Claims

1. A catalyst suitable for the acetoxylation of propylene consisting essentially of metals on a support said metals consisting essentially of palladium, bismuth, and rubidium.

2. A catalyst according to claim 1 wherein the catalyst contains 1 to 3 weight percent palladium, 1 to 3 weight percent bismuth, and 0.5 to 2.5 weight percent rubidium.

3. A catalyst according to claim 2 wherein said support is silica.

4,587,230

SUPPORTED CATALYSTS FOR THE SYNTHESIS OF 1,2-DICHLOROETHANE BY OXYCHLORINATION OF ETHYLENE WITHIN A FLUIDIZED BED AND METHOD FOR THE PREPARATION OF THE CATALYSTS

Enrico Cavaterra, Saronno, and Alessandro Bossi, Novara, both of Italy, assignors to Montepolimeri S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 591,993, Mar. 21, 1984, abandoned. This application Jun. 7, 1985, Ser. No. 742,238
Claims priority, application Italy, Mar. 22, 1983, 20198 A/83
Int. Cl.[4] B01J *21/04, 21/08, 21/12, 27/10*
U.S. Cl. 502—225 9 Claims

1. A supported dry-impregnated catalyst for the synthesis of 1,2-dichloroethane by C_2H_4 oxychlorination within a fluidized bed, said catalyst containing 1% to 10% by weight of Cu, with respect to the whole catalyst, and a carrier selected from the group consisting of microspheroidal Al_2O_3, microspheroidal SiO_2 and microspheroidal silica-alumina, and being characterized in that the molar ratio

$$MR = \frac{\text{Outer Me}}{\text{Outer Cu}}$$

as determined by XPS analysis is at least 40% higher than the molar ratio:

$$Y = \frac{\text{total Me present within the catalyst}}{\text{total Cu present within the catalyst}}$$

wherein Me is Al, Si or Al+Si and wherein, therefore, MR/Y$\geqq$1.40.

4,587,231

METHOD OF PRODUCING MONOLITHIC CATALYST FOR PURIFICATION OF EXHAUST GAS

Keiichi Sawamura; Yoshiyuki Eto; Junichi Mine, all of Yokohama, and Koji Masuda, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Nov. 15, 1984, Ser. No. 671,714
Claims priority, application Japan, Nov. 21, 1983, 58-217687
Int. Cl.[4] B01J *21/04, 21/06, 23/10*
U.S. Cl. 502—304 4 Claims

1. A method of producing a monolithic catalyst for simultaneous oxidation of carbon monoxide and hydrocarbons and reduction of nitrogen oxides in exhaust gases of internal combustion engines, the method including the steps of providing an active alumina base coating to a monolithic carrier by treating the monolithic carrier with a coating slip in which an active alumina powder containing cerium oxide, which is formed by thermal decomposition of a cerium salt applied to said active

alumina as a solution, is dispersed and then baking the treated carrier, and depositing at least one noble metal selected from the group consisting of Pt, Rh and Pd on said coating by thermal decomposition of an aqueous solution of a compound of each selected noble metal on said coating,

characterized in that a ceria powder is additionally dispersed in said coating slip;

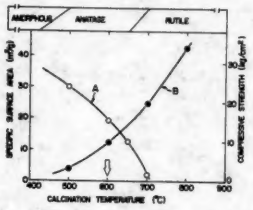
wherein the amount of said ceria powder is such that, in said coating, Ce of said ceria powder amounts to 5 to 50% by weight of said coating, and wherein the content of Ce in said active alumina powder is in the range from 1 to 5% by weight.

4,587,232

INORGANIC ADSORBENT AND PROCESS FOR PRODUCTION THEREOF

Fumio Kawamura; Makoto Kikuchi, both of Hitachi, and Kiyomi Funabashi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 29, 1983, Ser. No. 536,872
Claims priority, application Japan, Oct. 1, 1982, 57-170831
Int. Cl.⁴ B01J *21/06;* C01G *23/08*
U.S. Cl. 502—400 **16 Claims**



1. An inorganic adsorbent comprising a porous titanium metal and titanium oxide sintered and impregnated on the surfaces of micropores of said porous titanium metal; said titanium oxide being obtained from a titanium alkoxide of the formula: $Ti(OR)_4$, wherein R is a lower alkyl group.

4,587,233

USE OF ARG-PHE-AMIDE DERIVATIVES

Jack D. Barchas, Stanford; Eckard Weber; Christopher J. Evans, both of Palo Alto; E. T. Wei, El Cerrito; J. K. Chang, San Carlos, all of Calif.; Ingbert Fuchs, and Gabriele Mues, both of De Soto, Tex., assignors to Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Nov. 7, 1983, Ser. No. 549,961
Int. Cl.⁴ A61K *37/00*
U.S. Cl. 514—15 **4 Claims**

1. A method of elevating blood pressure in a mammal comprising the step of administering to said mammal an effective amount of a compound sufficient to induce blood pressure elevation, said compound selected from the group consisting of gamma$_1$-melanotropic stimulating hormone, Tyr-Gly-Gly-Phe-Met-Arg-Phe-NH_2, D-Phe-L-Met-L-Arg-L-Phe-NH_2, L-Phe-D-Met-L-Arg-L-Phe-NH_2, D-Phe-D-Met-L-Arg-L-Phe-NH_2, L-Met-L-Arg-L-Phe-NH_2, and L-Phe-L-Met-L-ARg-L-Phe.

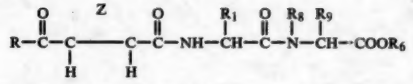
4,587,234

CARBOXY AND SUBSTITUTED CARBOXY ALKANOYL AND CYCLOALKANOYL PEPTIDES

Eric M. Gordon, and Harold N. Weller, III, both of Pennington, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

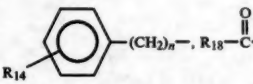
Division of Ser. No. 442,681, Nov. 18, 1982, Pat. No. 4,499,079.
This application Oct. 22, 1984, Ser. No. 663,727
Int. Cl.⁴ A61K *37/43;* C07K *5/06*
U.S. Cl. 514—19 **9 Claims**

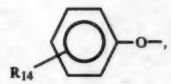
1. A compound of the formula



and a pharmaceutically acceptable salt thereof wherein:

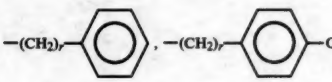
R is hydroxy, lower alkoxy, lower alkyl,

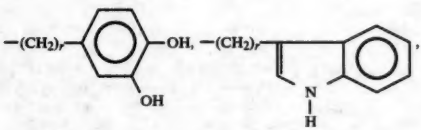


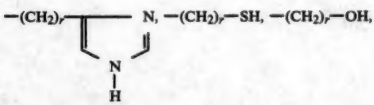


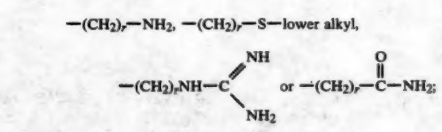
amino, HO—NH—, lower alkoxy-HN—, or MO—;

R_1 is hydrogen, lower alkyl, halo substituted lower alkyl,

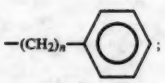




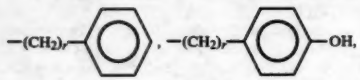


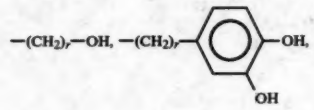


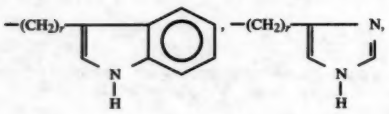
R_8 is hydrogen, lower alkyl, cycloalkyl of 3 to 7 carbons, or

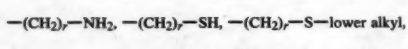


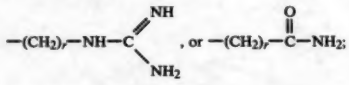
R_9 is hydrogen, lower alkyl,









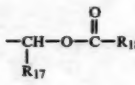


R_{14} is hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, chloro, bromo, fluoro, trifluoromethyl, or hydroxy;

n is zero one, two, three, or four;

r is an integer from 1 to 4;

R_6 is hydrogen, lower alkyl, benzyl, benzhydryl, salt forming ion, or



R_{17} is hydrogen, lower alkyl, cycloalkyl, or phenyl;

R_{18} is hydrogen, lower alkyl, lower alkoxy or phenyl;

M is a salt forming ion; and

Z completes a cycloalkyl ring of 3 to 10 carbons, said cycloalkyl ring in which one of the carbon atoms is substituted by a lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, halo, trifluoromethyl, or hydroxy group, a cycloalkenyl ring of 5 to 7 carbons, or a cycloalkadienyl ring of 6 or 7 carbons.

4,587,235

NOVEL ANDROSTANE DERIVATIVES, PROCESS FOR THEIR PRODUCTION, AND PHARMACEUTICAL PREPARATIONS CONTAINING THEM

Dieter Bittler; Henry Laurent; Klaus Nickisch, and Rudolf Wiechert, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

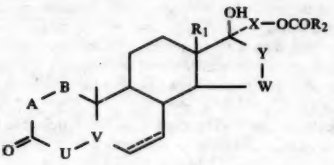
Division of Ser. No. 403,279, Jul. 29, 1982, Pat. No. 4,457,925. This application Jun. 27, 1984, Ser. No. 625,147

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1981, 3130644

Int. Cl.[4] A61K *31/56*

U.S. Cl. 514—178 **2 Claims**

1. An androstane of the formula



wherein

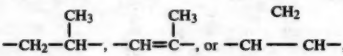
is a single bond or a double bond,

R_1 is methyl or ethyl,

R_2 is hydrogen or alkyl of 1–8 carbon atoms,

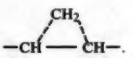
—X— is $—CH=CH(CH_2)_m—$, or $—C\equiv C—(CH_2)_m—$ wherein m is an integer of 1 to 4,

—A—B— is $—CH_2—CH_2—$, —CH=CH—, —CCl=CH—,



—U—V< is $—CH_2—CH<$, $—CH=C<$, $—C(OH)=C<$, or $—CCl=C<$, and

—W—Y— is $—CH_2—CH_2—$, $—CH_2—C(CH_3)_2—$, or



2. A topically administrable pharmaceutical composition comprising an amount of a compound of claim 1 effective to suppress sebum and a pharmaceutically acceptable carrier.

4,587,236

NOVEL 6α-METHYLPREDNISOLONE DERIVATIVES, THEIR PREPARATION, AND THEIR USE

Klaus Annen; Karl Petzoldt; Henry Laurent; Rudolf Wiechert, and Helmut Hofmeister, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

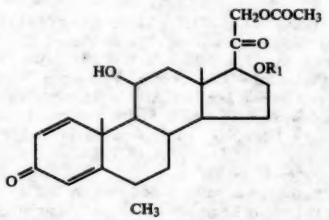
Continuation of Ser. No. 409,264, Aug. 18, 1982, abandoned. This application Oct. 27, 1983, Ser. No. 546,143

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1981, 3133081

Int. Cl.[4] A61K *31/56*

U.S. Cl. 514—179 **14 Claims**

2. A 6α-methylprednisolone derivative of the formula



wherein

R_1 is C_{3-6}-alkanoyl or benzoyl.

10. A pharmaceutical composition for topical administration comprising a topically antiinflammatorily effective amount of a compound of claim 2 and a pharmaceutically acceptable carrier for topically administrable pharmaceutical compositions.

4,587,237

MYCOTRIENIN-RELATED COMPOUNDS

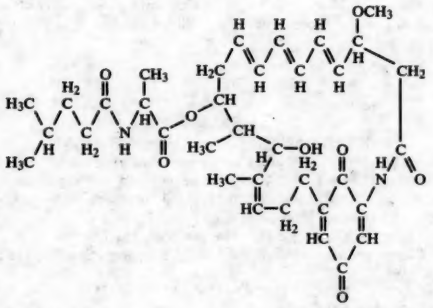
Noboru Otake, Yokohama; Haruo Seto, Hachioji; Tetsuo Sasaki, Kounosu; Masanori Sugita, Sakado, and Shigeru Hiramoto, Kawagoe, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Japan

Filed Sep. 6, 1985, Ser. No. 773,445

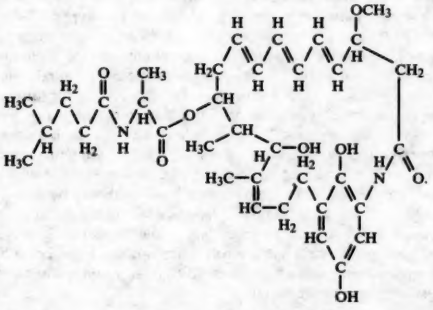
Int. Cl.[4] A61K *31/395;* C07D *225/06;* C12P *17/10*

U.S. Cl. 514—183 2 Claims

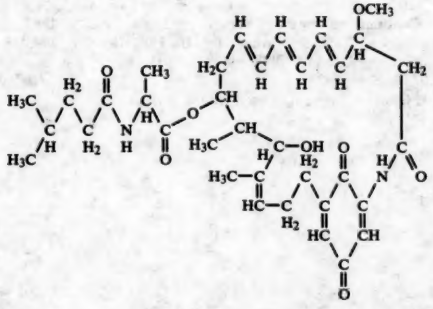
1. A compound of the formula



or

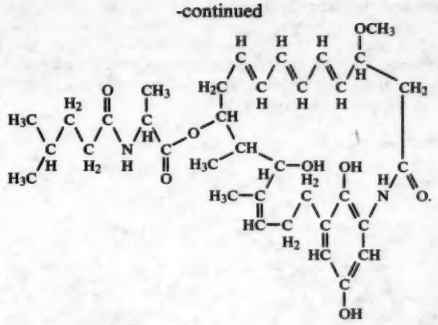


2. A method of treating tumors in a patient which comprises administering to said patient an antitumor effective amount of a compound of the formula



or

-continued



4,587,238

SUBSTITUTED CAPRYLOLACTAM DERIVATIVES AS ANTI-HYPERTENSIVES

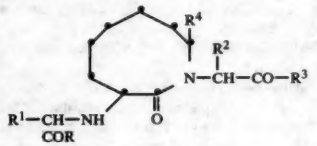
Elbert E. Harris; Arthur A. Patchett, both of Westfield, and Eugene D. Thorsett, Fanwood, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 280,667, Jul. 6, 1981, abandoned, which is a continuation-in-part of Ser. No. 179,321, Aug. 18, 1980, abandoned. This application Jul. 9, 1982, Ser. No. 396,583

Int. Cl.[4] A61K *31/33;* C07D *225/02*

U.S. Cl. 514—183 9 Claims

1. A compound of the formula:



(I)

wherein

R and R^3 are the same or different and are

hydroxy,

lower alkoxy,

lower alkenoxy,

aryloxy,

arloweralkoxy;

R^1 is

hydrogen,

alkyl, alkenyl and alkynyl of up to 12 carbon atoms which include branched groups, cycloalkyl of unsubstituted C_3–C_{10}; substituted loweralkyl wherein the substituent(s) can be halo, lower alkoxy, hydroxy, aryloxy, amino, loweralkylamino, aminoloweralkylthio, aminoloweralkoxy, diloweralkylamino, acylamino, arylamino, guanidino, phthalimido, mercapto, loweralkylthio, arylthio, carboxy, carboxamido or carboloweralkoxy, arloweralkyl, arloweralkenyl, heteroarlower alkyl or heteroarlower alkenyl, substituted arloweralkyl, or substituted heteroarlower alkyl, wherein the aryl or heteroaryl substituents are halo, dihalo, lower alkyl, hydroxy, lower alkoxy, amino, aminomethyl, phenyloxy, acylamino, diloweralkylamino, loweralkylamino, carboxyl, halologweralkyl, or aroyl;

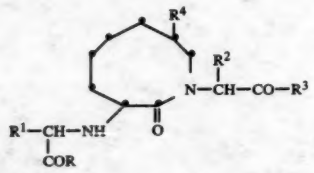
arloweralkyl or heteroarloweralkyl substituted on the alkyl portion by amino, hydroxy or acylamino;

R^2 and R^4 are hydrogen or lower alkyl;

and, the pharmaceutically acceptable salts thereof wherein in said R—R^4 groups, unless otherwise indicated, aryl and the prefix "ar" denote unsubstituted aromatic ring or rings of C_6–C_{12}, acyl denotes an organic radical derived from carbox-

ylic acid, and heteroaryl denotes an aryl group containing an N, O or S heteroatom.

7. A pharmaceutical composition useful in the treatment of hypertension which comprises a pharmaceutically acceptable carrier and an antihypertensively effective amount of an amino acid compound of the formula:



(I)

wherein

R and R^3 are the same or different and are

hydroxy,

lower alkoxy,

lower alkenoxy,

aryloxy,

arloweralkoxy,

R^1 is

hydrogen,

alkyl, alkenyl and alkynyl of up to 12 carbon atoms which include branched groups,

cycloalkyl of unsubstituted C_3–C_{10};

substituted loweralkyl wherein the substituent can be halo, lower alkoxy, hydroxy, aryloxy, amino, loweralkylamino, aminoloweralkylthio, aminoloweralkoxy, diloweralkylamino, acylamino, arylamino, guanidino, phthalimido, mercapto, loweralkylthio, arylthio, carboxy, carboxamido or carboloweralkoxy,

arloweralkyl, arloweralkenyl, heteroarlower alkyl or heteroarlower alkenyl,

substituted arloweralkyl or substituted heteroarlower alkenyl, wherein the aryl or heteroaryl substituents are halo, dihalo, lower alkyl, lower alkoxy, amino, aminomethyl, phenyloxy, acylamino, diloweralkylamino, loweralkylamino, carboxyl, halologweralkyl, or aroyl;

arloweralkyl or heteroarloweralkyl substituted on the alkyl portion by amino or acylamino;

R^2 and R^4 are hydrogen or lower alkyl; and, the pharmaceutically acceptable salts thereof wherein in said R—R^4 groups, unless otherwise indicated, aryl and the prefix "ar" denote unsubstituted aromatic ring or rings of C_6–C_{12}, acyl denotes an organic radical derived from carboxylic acid, and heteroaryl denotes an aryl group containing an N, O or S heteroatom.

4,587,239

1-AZOLYL-3-PYRAZOLYL-2-PROPANOL FUNGICIDES

Erik Regel, Wuppertal; Karl H. Büchel, Burscheid; Paul Reinecke, Leverkusen, and Wilhelm Brandes, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

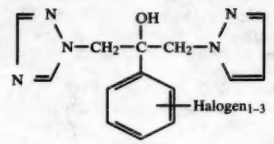
Filed Mar. 22, 1984, Ser. No. 592,162

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1983, 3313073

Int. Cl.[4] C07D *403/06, 231/12;* **A01N** *43/56, 43/653*

U.S. Cl. 514—184 **11 Claims**

1. A 1-azolyl-3-pyrazolyl-2-propanol derivative of the formula



or an addition product thereof with an acid or metal salt.

7. A method of combating fungi which comprises administering to such fungi or to a fungus habitat a fungicidally effective amount of a compound or addition product according to claim 1.

4,587,240

PHARMACEUTICAL COMPOSITIONS

Robert C. Hider, Clacton; George Kontoghiorghes; Jack Silver, both of London, and Michael A. Stockham, Saffron Walden, all of England, assignors to National Research Development Corp., London, England

Filed Sep. 18, 1984, Ser. No. 651,772

Claims priority, application United Kingdom, Sep. 23, 1983, 8325496

Int. Cl.[4] C07D *213/69;* **A61K** *31/555*

U.S. Cl. 514—188 **31 Claims**

1. A method for the treatment of a patient having a toxic concentration of iron in the body which comprises administering to said patient a compound being a 1-hydroxypyrid-2-one in which one or more of the hydrogen atoms attached to ring carbon atoms are replaced by a substituent selected from aliphatic acyl, aliphatic amide, cyano, aliphatic ester, halogen and hydroxy groups, alkoxy groups and alkoxy groups substituted by an alkoxy, aliphatic amide, aliphatic ester, halogen or hydroxy group, aliphatic hydrocarbon groups and aliphatic hydrocarbon groups substituted by an alkoxy, aliphatic ester, halogen or hydroxy group, but excluding compounds in which said replacement of hydrogen atoms is effected only by substituents selected from aliphatic hydrocarbon groups, halogen groups and aliphatic hydrocarbon groups substituted by a halogen group, or a salt therof containing a physiologically acceptable cation in an amount effective to reduce said toxic concentration of the metal.

4,587,241

HETEROCYCLIC SUBSTITUTED PENEMS

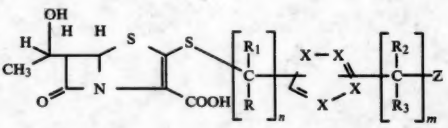
Viyyoor M. Girijavallabhan, Parsippany; Ashit K. Ganguly, Upper Montclair, and Richard W. Versace, Ringwood, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 555,738, Nov. 28, 1983, abandoned. This application Mar. 16, 1984, Ser. No. 590,086

Int. Cl.[4] C07D *499/00;* **A61K** *31/425*

U.S. Cl. 514—192 **14 Claims**

1. Compounds represented by the formula



and pharmaceutically acceptable salts and esters thereof in racemic or optically active forms wherein

n is 1, 2 or 3; m is 1, 2 or 3;

Z represents —COOH, —SO_3H,

or alkali metal salts thereof;

R, R_1, R_2 and R_3 independently represent hydrogen, lower alkyl, hydroxy lower alkyl, amino lower alkyl, carboxy lower alkyl, thio lower alkyl, lower alkoxy lower alkyl, carbonylamino lower alkyl, aminocarbonyl lower alkyl, cyano lower alkyl, fluoro lower alkyl, carbamoyloxy lower alkyl, or sulfamoyloxy with the proviso that when m is 2 or 3, R, R_1, R_2 and R_3 independently additionally represent hydroxy, amino, cyano, fluoro, carbamoyloxy, carbonylamino or $—SO_3H$;

each X independently represents —CH—, —N—, —S— or —O— with the proviso that at least one X is —N—.

4,587,242

SULFONIC RESINS HAVING A THERAPEUTICAL ACTIVITY, PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Elso Manghisi, and Giuseppe Cascio, both of Monza, Italy, assignors to Instituto Lusofarmaco d'Italia S.p.A., Milan, Italy

Filed Mar. 7, 1985, Ser. No. 709,081
Claims priority, application Italy, Mar. 9, 1984, 19960 A/84
Int. Cl.[4] A61K *31/55*; C07D *281/10*
U.S. Cl. 514—211 **14 Claims**

7. A new orally administrable pharmaceutical compound consenting delayed release of the therapeutically active component, comprising a cation exchange sulfonic type resin, wherein the acid groups of said resin are partly combined in the form of salts of said therapeutically active component selected from cis(±)-3-acetyloxy-5-[2-(dimethylamino)ethyl]-2,3-dihydro-2-(4-methoxyphenyl)-1,5-benzothiazepin-4(5H)-one, cis(±)-3-hydroxy-5-[2-(dimethylamino)ethyl]-2,3-dihydro-2-(4-methoxyphenyl)-1,5-benzothiazepin-4(5H)-one and the optically active isomers thereof, said compound comprises water that is buffered by means of a buffered solution to a pH of between 5 and 7.

14. The use of a compound according to claim 7, for the prohylaxis and therapy of acute and chronical coronary insufficiency and of arterial hypertension, wherein said compound is administered in a daily dose of between 1 and 30 mg per kg of body weight.

4,587,243

RAPID METHOD FOR INTERRUPTING THE COCAINE AND AMPHETAMINE ABUSE SYNDROME

Howard S. Lotsof, 330 Stanley Ave., Staten Island, N.Y. 10301

Filed Jul. 15, 1985, Ser. No. 754,836
Int. Cl.[4] A61K *31/55*
U.S. Cl. 514—214 **9 Claims**

1. The method of treating cocaine and/or amphetamine abuse comprising internally administering to the abuser a composition including ibogaine or a therapeutically active compound thereof or a mixture thereof.

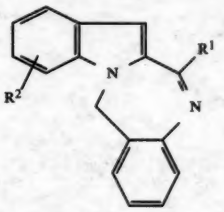
4,587,244

AMIDINE BENZODIAZEPINES, METHODS FOR THEIR USE AND INTERMEDIATES

Chih Y. Ho, Lansdale, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.

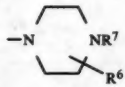
Continuation-in-part of Ser. No. 599,095, Apr. 11, 1984, Pat. No. 4,547,497. This application Apr. 10, 1985, Ser. No. 721,723
Int. Cl.[4] A61K *31/55*
U.S. Cl. 514—219 **2 Claims**

1. A method for inhibiting ovulation which comprises administering to a mammal an effective amount of a benzodiazepine of the formula:



wherein

R^1 is an amine function of the formula;

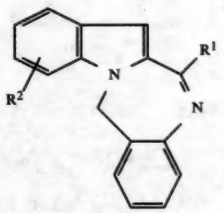


R^2 is hydrogen, alkoxy of about 1 to 6 carbons, alkyl of about 1 to 6 carbons, trifluoromethyl, halogen, nitro, hydroxy or dialkylamino of about 2 to 10 carbons;

R^6 is hydrogen, alkyl of about 1–6 carbons, carboxy, alkoxycarbonyl wherein the alkoxy group contains 1–6 carbons or phenyl; and

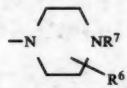
R^7 is hydrogen, alkyl of about 1 to 8 carbons, alkoxycarbonyl wherein the alkoxy group contains 1 to 6 carbons or alkyl of about 1 to 8 carbons substituted by a single substituent selected from the group consisting of hydroxy, fluoro, chloro, bromo, iodo, alkoxy of about 1 to 6 carbons, phenoxy or alkoxycarbonyl wherein the alkoxy group contains 1 to 6 carbons, and the pharmaceutically acceptable salts thereof, in association with a pharmaceutically acceptable diluent or carrier.

2. A method of preventing implantation which comprises administering to a mammal an effective amount of a benzodiazepine of the formula:



wherein

R^1 is an amine function of the formula:



R^2 is hydrogen, alkoxy of about 1 to 6 carbons, alkyl of about 1 to 6 carbons, trifluoromethyl, halogen, nitro, hydroxy or dialkylamino of about 2 to 10 carbons;

R^6 is hydrogen, alkyl of about 1–6 carbons, carboxy, alkoxycarbonyl wherein the alkoxy ground contains 1–6 carbons or phenyl; and

R^7 is hydrogen, alkyl of about 1 to 8 carbons, alkoxycarbonyl wherein the alkoxy group contains 1 to 6 carbons or alkyl of about 1 to 8 carbons substituted by a single substituent selected from the group consisting of hydroxy, fluoro, chloro, bromo, iodo, alkoxy of about 1 to 6 carbons, phenoxy or alkoxycarbonyl wherein the alkoxy group contains 1 to 6 carbons, and the pharmaceutically acceptable salts thereof, in association with a pharmaceutically acceptable diluent or carrier.

4,587,245

METHOD OF TREATING NEUROPSYCHIC DISTURBANCES BY BENZODIAZEPINE DERIVATIVES AND COMPOSITION THEREFOR

Henri Demarne, Montpellier, and André Hallot, Saint-Gely-Du-Fesc, both of France, assignors to Sanofi, Paris, France

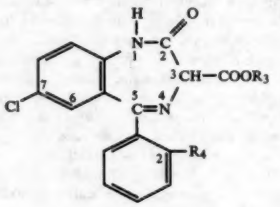
Continuation-in-part of Ser. No. 545,588, Oct. 26, 1983, abandoned, which is a continuation of Ser. No. 170,748, Jul. 21, 1980, abandoned, which is a continuation of Ser. No. 015,466, Feb. 26, 1979, abandoned, which is a division of Ser. No. 794,243, May 5, 1977, abandoned. This application Jan. 28, 1985, Ser. No. 695,557

Claims priority, application United Kingdom, May 5, 1976, 18492/76

Int. Cl.[4] A61K *31/55*

U.S. Cl. 514—221 **11 Claims**

1. A method for the treatment of a patient subject to neuropsychic disturbances which comprises administering orally to said patient an effective therapeutic dose of a compound of formula



wherein R3 is methyl or ethyl and R4 is chlorine or fluorine; said compound being present in an amount sufficient to bring about an anxiolytic effect but without inducing significant sedation.

4,587,246

1,3,4-THIADIAZIN-2-ONES

David Brown, Macclesfield; Robert I. Dowell, Congleton; Rodney B. Hargreaves, Poynton, and Brian G. Main, Sandbach, all of England, assignors to Imperial Chemical Industries PLC, London, England

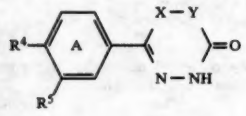
Division of Ser. No. 528,103, Aug. 31, 1983, Pat. No. 4,503,054, which is a division of Ser. No. 321,899, Nov. 16, 1981, Pat. No. 4,423,045. This application Nov. 28, 1984, Ser. No. 675,741

Claims priority, application United Kingdom, Nov. 14, 1980, 8036680

Int. Cl.[4] C07D *285/16, 417/12, 417/10;* **A61K** *31/54*

U.S. Cl. 514—222 **7 Claims**

1. A heterocyclic compound of the formula:



wherein x is —CR^1R^2— and Y is sulphur, wherein R^1 and R^2, which may be the same or different, each is hydrogen or alkyl of up to 4 carbon atoms;

wherein R^4 and R^5, which may be the same or different, each is hydrogen, cyano, or alkylthio of up to 4 carbon atoms, or has the formula:

—Q—CZ—OR^6 —Q—SO_2—NR^7R^8

—Q—CZ—NR^7R^8 —Q—SO_2—R^9

—Q—CZ—R^9 —Q—SO—R^9

wherein Q is a direct link, or is imino (—NH—), or is oxyalkylene of up to 4 carbon atoms, where Z is oxygen or sulphur and wherein R^6, R^7, R^8 and R^9, which may be the same or different, each is hydrogen, alkyl, alkenyl, cycloalkyl or alkoxyalkyl each of up to 6 carbon atoms, or aryl or arylalkyl each of up to 12 carbon atoms, or wherein R^7 and R^8 together with the adjacent nitrogen atom form a 5- or 6-membered fully-saturated heterocyclic ring, provided that R^4 and R^5 are not both hydrogen;

or wherein R^4 and R^5 are joined together such that with the benzene ring A they form a benz-heterocyclic ring wherein the heterocyclic part is a 5- or 6- membered ring containing one oxygen, sulphur or nitrogen atom, and which heterocyclic part may optionally contain an oxo substituent or an alkyl or alkanoyl substituent each of up to 6 carbon atoms;

and wherein the benzene ring A bears no further substituent or bears one or more chloro, bromo, methyl, ethyl, methoxy, or ethoxy substituents;

or a salt thereof where appropriate.

4,587,247

SUBSTITUTED AND UNSUBSTITUTED 13-(ALKOXY)METHOXY DERIVATIVES OF THE AVERMECTIN AGLYCONES, COMPOSITIONS AND USE

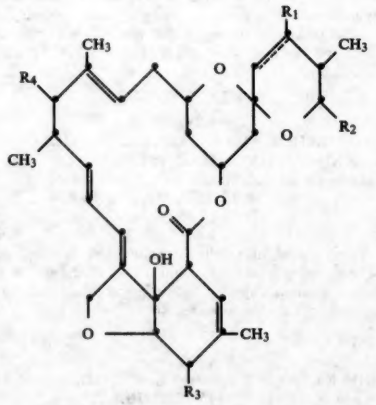
Bruce O. Linn, Bridgewater, and Helmut H. Mrozik, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 25, 1985, Ser. No. 705,254

Int. Cl.[4] A61K *31/365, 31/535;* **C07D** *493/22*

U.S. Cl. 514—222 **12 Claims**

1. A compound having the formula:



wherein the broken line indicates a single or a double bond; wherein

R_1 is H, —OH, provided that the broken line indicates a single bond when R_1 is OH;

R_2 is methyl, ethyl, iso-propyl or sec-butyl;

R_3 is OH, OCH_3, $OSi(CH_3)_2C(CH_3)_3$;

R_4 is $X—(CH_2)_n—O—CH_2O—$ wherein n is an integer ranging from 1–6 and X is hydrogen; alkyl C_{1-6}; alkoxy C_{1-6}; polyalkoxy, $H—[(CH_2)_pO]_m—$ wherein m is an integer from 2–6 and p is an integer ranging from 1–6; phenyl, phenyl (alkoxy C_{1-4}), acyloxy C_{1-4}; hydroxy; phenyl poly-(alkoxy), $—[(CH_2)_pO]_m—$ wherein m and p are as defined above; halogen; amino; alkylamino C_{1-5}; dialkylamino C_{2-8}; or heterocyclic 3–6 membered nitrogen containing ring optionally containing an additional oxygen, sulfur or nitrogen heteroatom wherein the ring nitrogen is bonded to the alkoxy group.

11. A pharmaceutical composition for treatment of animals infected with parasites which comprises a therapeutically effective dosage amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

4,587,248

4-ALKYL-THIOPHENYL-ETHANOLAMINES, HAVING AN ACTIVITY THE CEREBRAL CIRCULATION, THE BLOOD PLATELET-AGGREGATION AND THE LIPENIA

Giorgio Cantarelli, Via Gozzano 4; Giampaolo Picciola, P. le Baracca 6; Franco Ravenna, Via Vincenzo Monti 57/A, all of Milan, and Mario Riva, Via Monteverdi 21, Monza(Milan), all of Italy

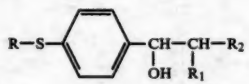
Filed May 27, 1982, Ser. No. 382,649

Claims priority, application Italy, May 27, 1981, 21998 A/81; Feb. 17, 1982, 19693 A/82

Int. Cl.⁴ A61K *31/495;* **C07D** *241/04*

U.S. Cl. 514—255 **16 Claims**

1. A 4-alkyl-thiophenyl-ethanolamine having the formula:



wherein:

R is a straight-chain alkyl or a branched-chain alkyl having from 1 to 4 carbon atoms,

R_1 is a straight-chain alkyl, or a branched-chain alkyl having from 1 to 3 carbon atoms, and

R_2 is a 1-piperazinyl carrying as a substituent in its 4-position, a cinnamoyl or a cinnamyl radical or a cinnamoyl or cinnamyl radical having a substituent in at least one of its 3, 4, and 5 positions, said substituent being a methoxy, ethoxy, hydroxy, amino or nitro group.

12. A process of imparting an anti-blood platelet aggregation action to an animal comprising administering to the animal an amount of a compound of claim 1 effective to impart said anti-blood platelet aggregation action.

4,587,249

ANALGESIC AND ANTI-INFLAMMATORY COMPOSITIONS COMPRISING CAFFEINE AND METHODS OF USING SAME

Abraham Sunshine, New York; Eugene M. Laska, Larchmont, and Carole E. Siegel, Mamaroneck, all of N.Y., assignors to Analgesic Associates, Larchmont, N.Y.

Division of Ser. No. 474,358, Mar. 11, 1983, Pat. No. 4,486,436, which is a continuation of Ser. No. 400,597, Jul. 22, 1982, abandoned. This application Aug. 22, 1984, Ser. No. 643,196

Int. Cl.⁴ A61K *31/52*

U.S. Cl. 514—265 **23 Claims**

1. A method for eliciting an onset hastened and enhanced analgesic or anti-inflammatory response in a mammal, comprising administering to said mammal a pharmaceutical composition comprising:

(a) an analgesically and anti-inflammatorily effective amount of a non-steroidal anti-inflammatory drug comprising an oxicam derivative or a pharmaceutically acceptable salt thereof selected from piroxicam, sudoxicam, isoxicam and [4-hydroxyl-1,2-benzothiazine-1,1-dioxide-4-(N-phenyl)-carboxamide]; and

(b) an amount of caffeine sufficient to hasten the onset of and enhance the analgesic or anti-inflammatory response.

4,587,250

THIAZASPIRANE DERIVATIVES, PROCESS FOR THEIR PREPARATION, AND MEDICAMENTS

Rainer Klauser; Eike Meinetsberger, and Klaüs Bichlmayer, all of Munich, Fed. Rep. of Germany, assignors to Luitpold-Werk Chemischpharmazeutische Fabrik GmbH & Co., Munich, Fed. Rep. of Germany

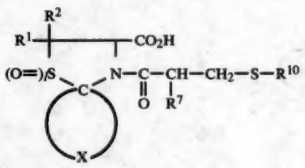
Filed Feb. 8, 1983, Ser. No. 465,025

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1982, 3204373

Int. Cl.⁴ C07D *277/60;* **A61K** *31/425*

U.S. Cl. 514—278 **13 Claims**

1. A mercaptoacyl derivative of a thiazaspiro compound



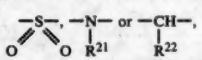
and salts thereof with physiologically acceptable bases, in which the connecting lines shown in the formula between the spiro-carbon atom and X are lower alkylene groups of identical or different chain lengths, and the X-containing ring thereby formed contains 5 or 6 ring members and X can occupy any positions except the positions immediately adjacent to the spiro-carbon atom,

R^1 and R^2 independently of one another are hydrogen or methyl,

R^7 is hydrogen or lower alkyl with not more than 6 carbon atoms,

R^{10} is hydrogen, lower alkanoyl with not more than 6 carbon atoms or benzoyl,

X is oxygen, sulfur,



in which R^{21} is lower alkanoyl with not more than 6 carbon atoms or benzoyl, R^{22} is hydrogen, lower alkyl with not more than 6 carbon atoms or phenyl,

1 is 0 or 1, with the proviso that is X is

1 is 1.

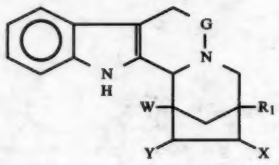
4,587,251
INDOLO[2,3-A]QUINOLIZINE AND INDOLO[2,3-G]CYCLOPENT[A]INDOLIZINE DERIVATIVES, COMPOSITIONS AND METHODS EMPLOYING THEM FOR TREATING ULCERS

Elemer Ezer; László Szporny; György Hajós; Csaba Szántay; Tibor Keve; György Fekete; Gábor Megyeri; Tibor Ács, and Hedvig Bölcskei, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar R.T., Budapest, Hungary

Filed Jun. 27, 1984, Ser. No. 625,071
Claims priority, application Hungary, Jun. 29, 1983, 2342/83
Int. Cl.[4] A61K *31/435;* C07D *471/14, 471/18*
U.S. Cl. 514—281 8 Claims

1. Compounds of the formula (II),

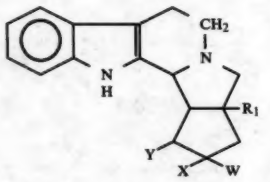
(II)



in which
W is alkoxycarbonyl having from one to four carbon atoms in the alkoxy moiety or cyano,
R_1 is hydrogen or alkyl having from one to four carbon atoms,
G is a $>CH_2$ or $>C=O$ group, and
X and Y each stands for hydrogen or together represent a C—C bond.

2. Compounds of the formula (III),

(III)



in which
W is alkoxycarbonyl having from one to four carbon atoms in the alkoxy moiety or cyano,
R_1 is hydrogen or alkyl having from one to four carbon atoms, and
X and Y each stands for hydrogen or together represent a C—C bond.

7. A method of treating ulcers in an animal subject which comprises the step of administering to said animal subject a pharmaceutically effective amount of the compound of the Formula (II) as defined in claim 1.

8. A method of treating ulcers in an animal subject which comprises the step of administering to said animal subject a pharmaceutically effective amount of the compound of the Formula (III) as defined in claim 2.

4,587,252
HYDROCODONE/IBUPROFEN PHARMACEUTICAL COMPOSITIONS AND METHOD

John D. Arnold, Kansas City, Mo., assignor to Brighton Pharmaceutical, Inc., Kansas City, Mo.

Filed Dec. 18, 1984, Ser. No. 682,906
Int. Cl.[4] A61K *31/19, 31/44, 31/185*
U.S. Cl. 514—282 6 Claims

1. A process for treating pain in a mammal which comprises administering to the mammal an amount of a pharmaceutical composition effective to provide an analgesic effect, said pharmaceutical composition comprising hydrocodone or a pharmaceutically acceptable acid addition salt thereof and ibuprofen or a pharmaceutically acceptable acid addition salt thereof, the ratio of hydrocodone to ibuprofen being within the range that the administration of a therapeutic amount of said composition to a mammal will provide a greater analgesic effect than the effect obtainable by use of either hydrocodone or a pharmaceutically acceptable acid addition salt thereof or ibuprofen or a pharmaceutically acceptable acid addition salt thereof alone.

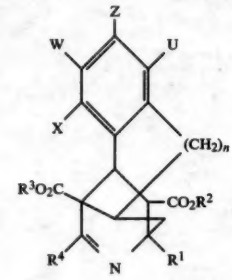
4,587,253
BRIDGED PYRIDINE COMPOUNDS USEFUL AS CALCIUM CHANNEL BLOCKERS AND ANALGESICS

Wasyl Halczenko, Hatfield, and George D. Hartman, Lansdale, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 30, 1984, Ser. No. 635,971
Int. Cl.[4] A61K *31/44, 31/47;* C07D *221/22*
U.S. Cl. 514—289 13 Claims

1. A compound represented by the following general structural formula (I):

(I)



wherein:
n is 0 or 1;
R^1 and R^4 independently are hydrogen or C_1–C_8 alkyl;
R^2 and R^3 independently are C_1–C_8 alkyl; and
X, W, Z and U independently are hydrogen, C_1–C_8 alkoxy, CF_3, cyano, nitro, or halo provided that at least two of X, W, Z and U are hydrogen.

11. A pharmaceutical composition useful in the treatment of cardiovascular disorders in which a high cellular concentration of Ca^{++} is a factor comprising a nontoxic therapeutically effective amount of a compound according to claim 1 or 2 in an admixture with a pharmaceutically acceptable carrier.

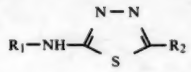
12. A method of treatment for cardiovascular disorders in which a high cellular concentration of Ca^{++} is a factor which comprises administering to a subject in need of such treatment a nontoxic therapeutically effective amount of a compound according to claim 1 or 2.

4,587,254
1,3,4-THIADIAZOLE DERIVATIVES, PROCESS FOR THE PRODUCTION THEREOF AND USE THEREOF AS ANTIULCER AGENT

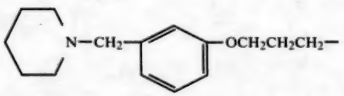
Hatsunori Toyofuku, Yokohama; Yoshihiro Tsuriya, Hatano; Toshio Kuroda, Sagamihara; Hitoshi Aoki, Fujisawa, and Hiroshi Nagasawa, Hatano, all of Japan, assignors to Wakamoto Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Jul. 19, 1984, Ser. No. 632,333
Claims priority, application Japan, Sep. 24, 1983, 58-175221
Int. Cl.[4] C07D *31/445, 417/12*
U.S. Cl. 514—326 12 Claims

1. A 1,3,4-Thiadiazole compound having the general formula:



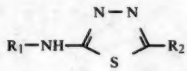
wherein R_1 comprises a 1-(3-piperidinomethyl)phenoxypropyl substituent having the formula:



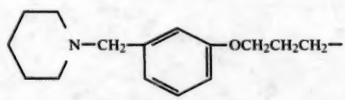
and R_2 represents an amino, lower alkylamino, cyclohexylamino, benzolylamino, mercapto, or lower alkylthio group and and the acid-addition salts thereof selected from the group consisting of hydrochloric, hydrobromic, phosphoric, acetic, maleic, fumaric, lactic, tartaric, citric and gluconic acid salts.

3. An antiulcer agent, comprising:

a 1,3,4-thiadiazole compound, as an active ingredient, having the general formula:



wherein R_1 comprises a 1-(3-piperidinomethyl)phenoxypropyl substituent having the formula:



and R_2 represents an amino, lower alkylamino, cyclohexylamino, benzolylamino, mercapto, or lower alkylthio group and the acid-addition salts thereof selected from the group consisting of hydrochloric, hydrobromic, phosphoric, acetic, maleic, fumaric, lactic, tartaric, citric and gluconic acid salts; and

an excipient or adjuvant, in any amount sufficient to prepare a peroral or parenteral formulation, selected from the group consisting of polyvinyl pyrrolidone, sodium chondroitin sulfate, gelatin, human serum albumin, dextran T-10, calcium gluconate, calcium pantothenate, calcium lactate, β-cyclodextrin, lactose, starch, magnesium stearate, talc, vegetable oil, carboxymethylcellulose, citric acid, sodium dihydrogenphosphate, mannitol, crystalline cellulose and polyvinyl alcohol.

4,587,255

ISOMERS OF 3-(2,2-DICHLOROVINYL)-2,2-DIMETHYLCYCLOPROPANECARBOXYLIC ACID-α-METHYL-(6-PHENOXY-2-PICOLYL)ESTER, PROCESSES FOR PRODUCING THEM, AND THEIR USE FOR CONTROLLING PESTS

Peter Ackermann, Pfeffingen; Laurenz Gsell, Basel, and Boris Kohler, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

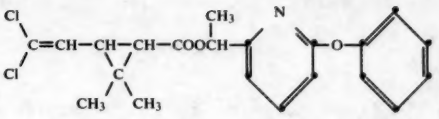
Filed Dec. 8, 1983, Ser. No. 559,544

Claims priority, application Switzerland, Dec. 14, 1982, 7271/82; Nov. 16, 1983, 6157/83

Int. Cl.⁴ A01N *43/40;* **C07D** *213/64*

U.S. Cl. 514—345 **9 Claims**

1. A R-cis or R-trans isomer of the formula



9. A method of combating insects and acarids, which method comprises the step of applying thereto or to the locus thereof an effective amount of a compound of claim 1.

4,587,256

NOVEL THIAZOLIDINE DERIVATIVES

Heinz Hasler, Kaiseraugst, and Fernand Schneider, Basel, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

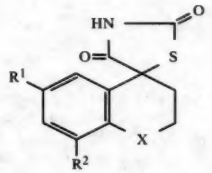
Filed Jun. 11, 1984, Ser. No. 619,655

Claims priority, application Switzerland, Jun. 23, 1983, 3432/83; Apr. 13, 1984, 1860/84

Int. Cl.⁴ C07D *513/10, 277/60;* **A61K** *31/425*

U.S. Cl. 514—369 **22 Claims**

1. A compound of the formula



I

wherein

X is methylene, oxygen or sulfur R^1 is halogen; R^2 is hydrogen nitro, cyano, OR^3 or NHR^3; or R^1 and R^2 both simultaneously are hydrogen or nitro; R^3 is hydrogen, alkyl of 1 to 12 carbon atoms, alkanoyl of 1 to 12 carbon atoms, aroyl of 7 to 14 carbon atoms, —CO—OR^4 or —CO—NHR^4; and R^4 is alkyl of 1 to 12 carbon atoms, phenyl, halophenyl, nitrophenyl, benzyl or nitrobenzyl, or a salt thereof with a physiologically compatible cation.

4,587,257

CONTROL OF OCULAR BLEEDING USING CLONIDINE DERIVATIVES

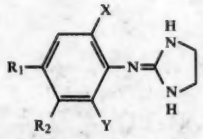
Louis M. DeSantis, Fort Worth; Joseph M. deFaller, Bedford, and Billie M. York, Jr., Fort Worth, all of Tex., assignors to Alcon Laboratories, Inc., Forth Worth, Tex.

Filed Dec. 14, 1984, Ser. No. 682,593

Int. Cl.⁴ A61K *31/415*

U.S. Cl. 514—392 **21 Claims**

1. A method for the control of ocular bleeding in the eye of a human being which comprises topically applying to an affected eye an ophthalmic formulation containing an hemostatically effective amount of an imidazoline compound of the formula:



(I)

wherein: R_1 and R_2 are selected from the group consisting of H, OH, and NHR′, wherein R′ is selected from the group consisting of H and C_1–C_4 alkyl, provided that one of R_1 and

R_2 is always hydrogen; and X and Y are selected from the group consisting of Br, Cl, CH_3 and CH_2CH_3 or a pharmaceutically acceptable free base or acid salt thereof.

4,587,258

ANGIOTENSIN-CONVERTING ENZYME INHIBITORS

Elijah H. Gold; Bernard R. Neustadt, both of West Orange, and Elizabeth M. Smith, Verona, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

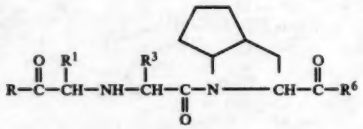
Continuation-in-part of Ser. No. 258,484, Apr. 28, 1981, which is a continuation-in-part of Ser. No. 201,649, Oct. 28, 1980, abandoned, which is a continuation-in-part of Ser. No. 199,886, Oct. 23, 1980, abandoned. This application Jul. 30, 1984, Ser. No. 635,390

Claims priority, application European Pat. Off., Oct. 15, 1981, 81108348.4

Int. Cl.[4] A61K *31/40;* **C07K** *5/06;* **C07D** *209/02*

U.S. Cl. 514—412 **30 Claims**

1. A compound represented by the formula



and the pharmaceutically acceptable salts thereof, wherein R and R^6 are the same or different and are hydroxy, lower alkoxy, lower alkenoxy, dilower alkylamino lower alkoxy, acylamino lower alkoxy, acyloxy lower alkoxy, aryloxy, arylloweralkoxy, amino, lower alkylamino, dilower alkylamino, hydroxyamino, aryllower alkylamino, or substituted aryloxy or substituted aryllower alkoxy wherein the substituent is methyl, halo or methoxy;

R^1 is hydrogen, alkyl of from 1 to 10 carbon atoms, including branched and cyclic and unsaturated alkyl groups, substituted lower alkyl wherein the substituent is hydroxy, lower alkoxy, aryloxy, substituted aryloxy, heteroaryloxy, substituted heteroaryloxy, amino, lower alkylamino, diloweralkylamino, acylamino, arylamino, substituted arylamino, guanidino, imidazolyl, indolyl, lower alkylthio, arylthio, substituted arylthio, carboxy, carbamoyl, lower alkoxycarbonyl, aryl, substituted aryl, aralkyloxy, substituted aralkyloxy, aralkylthio, or substituted aralkylthio, wherein the aryl or heteroaryl portion of said substituted aryloxy, heteroaryloxy, arylamino, arylthio, aryl, aralkyloxy or aralkylthio groups is substituted with a group selected from halo, loweralkyl, hydroxy, lower alkoxy, amino, aminomethyl, carboxyl, cyano and sulfamoyl;

R^3 is hydrogen, lower alkyl, phenyl lower alkyl, aminomethylphenyl lower alkyl, hydroxyphenyl lower alkyl, hydroxy lower alkyl, acylamino lower alkyl, amino lower alkyl, dimethylamino lower alkyl, guanidino lower alkyl, imidazolyl lower alkyl, indolyl lower alkyl, or lower alkylthio lower alkyl.

4,587,259

MITICIDAL 2-(2-METHYL-2,3-DIHYDRO-BENZOFURAN-7-YL)HYDRAZINECARBOXYLIC ACID ESTERS

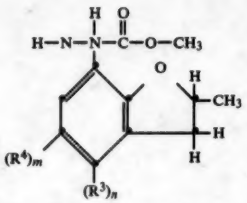
Kurt H. Pilgram, and Richard D. Skiles, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 29, 1984, Ser. No. 626,556

Int. Cl.[4] A01N *47/24;* **C07D** *307/79*

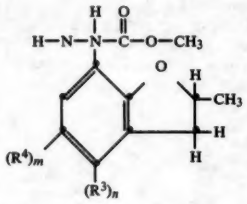
U.S. Cl. 514—469 **5 Claims**

1. A compound of the formula



wherein m and n each is one, one of R^3 and R^4 is methyl and the other is chlorine.

4. A method for protecting a plant from mites that comprises applying to the plant a miticidally effective dosage of a compound of the formula:



wherein R^3 and R^4 each is bromine, chlorine or methyl, m is zero or one, n is zero or one, with the proviso that m+n=one or two.

4,587,260

DIBENZALACETONE AND BENZYLCINNAMATE AS NON-STEROIDAL ANTI-INFLAMMATORY COMPOUNDS AND COMPOSITIONS THEREOF

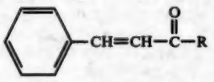
Richard V. Smerbeck, Hackettstown, and Eugene P. Pittz, Randolph, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jun. 21, 1984, Ser. No. 623,272

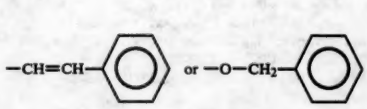
Int. Cl.[4] C07C *69/76*

U.S. Cl. 514—532 **9 Claims**

1. A method for the treatment of inflammation in mammals comprising administering a therapeutically effective amount of the compound having the formula:



wherein R is



4,587,261

CYCLOALKANE DERIVATIVES AND FODDER COMPOSITIONS CONTAINING THE SAME

Zoltán Budai; Pál Benkó; Ildikó Rátz née Simonek; Éva Rákóczy née Pintér; Károly Magyar; József Kelemen, and Attila Mándi, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

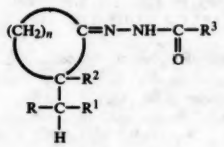
Filed May 3, 1983, Ser. No. 491,083

Claims priority, application Hungary, May 4, 1982, 1380/82

Int. Cl.[4] C07C *125/065, 125/067;* A61K *31/27*

U.S. Cl. 514—542 8 Claims

1. A cycloalkene compound of the formula I



(I)

wherein

n is 3, 4, 5 or 6;

R is phenyl which can have one or more substituents selected from the group consisting of halogen, lower alkoxy and lower alkyl;

R^1 and R^2 each are hydrogen or form together a valence bond;

R^3 is lower alkoxy or a phenyl which can be substituted with one or more C_{1-12} alkoxy.

5. A fodder having weight-gain increasing effect comprising as active ingredient an amount of 1 ppm to 85% by weight of a compound as defined in claim 1 in admixture with a suitable inert solid or liquid carrier or diluent.

4,587,262

HALOGENOPHENYL GLYCERIDE ESTERS FOR USE IN THE PROPHYLAXIS AND/OR THERAPY OF ACNE VULGARIS

Jean C. Arnould, Cormonpreuil, France; John R. Evans, Macclesfield, United Kingdom; Geraint Jones, Prestbury, United Kingdom, and David S. Thomson, Holmes Chapel, United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

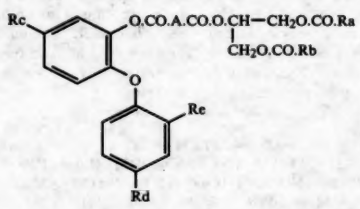
Filed Jun. 6, 1983, Ser. No. 501,758

Claims priority, application European Pat. Off., Jun. 18, 1982, 82401119.1

Int. Cl.[4] A61K *31/235;* C07C *69/00*

U.S. Cl. 514—548 11 Claims

1. An ester of the formula I



I

wherein Ra and Rb are independently selected from (3–20C)alkyl and (3–20C)alkenyl; Rc and Rd are independently selected from chloro or bromo; Re is hydrogen, chloro or bromo; and A is (1–6C)alkylene optionally bearing one or two (1–4C)alkyl substituents.

4,587,263

CYCLOALIPHATIC AMINOSULFONIC ACID DERIVATIVES

Gerhard Satzinger, Denzlingen; Johannes Hartenstein, Stegen-Wittental; Edgar Fritschi, St. Peter, and Wolf-Dieter Vigelius, Denzlingen, all of Fed. Rep. of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

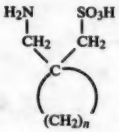
Filed Jul. 26, 1984, Ser. No. 634,839

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327318

Int. Cl.[4] A61K *31/185;* C07C *143/21*

U.S. Cl. 514—553 6 Claims

1. An aminosulfonic acid of the general formula I



(I)

wherein n is 4, 5, or 6.

3. A method for treating cardiovascular diseases comprising administering to a host suffering therefrom an effective amount of a compound according to claim 1 in unit dosage form.

4,587,264

DISINFECTION AND STERILIZING SOLUTION OF PERACETIC ACID AND NITRIC ACID

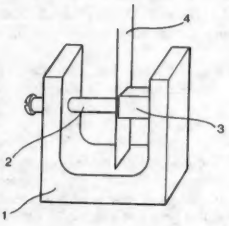
Eric Jourdan-Laforte, Paris, and Daniel Le Rouzic, Aubervilliers, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Feb. 3, 1983, Ser. No. 463,617

Claims priority, application France, Feb. 24, 1982, 82 03000

Int. Cl.[4] A61K *31/20*

U.S. Cl. 514—557 11 Claims



1. A concentrated solution for dilution with chloride ion-containing water to provide a diluted non-corrosive disinfecting and sterilizing solution, said concentrated solution containing between 1 and 20% by weight of peracetic acid, further containing nitric acid in a weight percentage 3 to 5 times that of said peracetic acid.

4,587,265

INHIBITION OF DIARRHEA INDUCED BY *ESCHERICHIA COLI* HEAT-STABLE ENTEROTOXIN

Richard N. Greenberg, Kirkwood, Mo., assignor to St. Louis University, St. Louis, Mo.

Filed Feb. 7, 1983, Ser. No. 464,702

Int. Cl.[4] A61K *31/195*

U.S. Cl. 514—562 5 Claims

1. The method of inhibiting diarrhea induced by *Escherichia coli* heat-stable enterotoxin comprising the administration to mammals afflicted with such diarrhea of a substantially non-

toxic material constituting a source of sulfhydryl groups in an effective amount of said material sufficient to inhibit such diarrhea.

4,587,266

ANTIMICROBIAL COMPOSITIONS

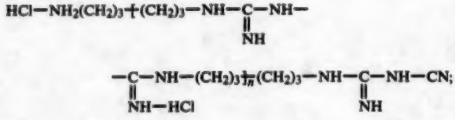
Robert J. Verdicchio, Succasunna, N.J., assignor to Johnson & Johnson Baby Products Company, New Brunswick, N.J.

Continuation-in-part of Ser. No. 423,379, Sep. 24, 1982, abandoned. This application Oct. 24, 1984, Ser. No. 664,287

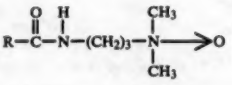
Int. Cl.[4] A01N *37/52, 33/24;* **C11D** *3/48*

U.S. Cl. 514—635 **6 Claims**

1. An antibacterial composition, comprising as the active ingredients (a) a bis-biguanide compound of the formula



wherein n is from 4.5 to 6.5; or chlorhexidine salts selected from the group consisting of chlorhexidine acetate, chlorhexidine hydrochloride and chlorhexidine gluconate; and (b) an amidoamine oxide of the formula



wherein R is straight chain alkyl of from 7 to 17 carbon atoms or mixtures thereof and wherein the amidoamine oxide and bis-biguanide compound are present in a weight ratio of about 1:1.

4,587,267

CONTROLLED RELEASE SYSTEM

Cyril F. Drake, Harlow, and Alfred J. Arch, Stansted, both of England, assignors to Standard Telephones and Cables, PLC, London, England

Filed Sep. 13, 1984, Ser. No. 650,045

Claims priority, application United Kingdom, Sep. 15, 1983, 8324784

Int. Cl.[4] A61K *9/26*

U.S. Cl. 514—769 **12 Claims**

1. A device for the controlled release of an active material into an aqueous medium in contact with the device, the device including a porous coherent body of a sintered particulate water soluble glass, the pores of said body being impregnated with a material comprising wholly or partially an active material, the device being such that, when contacted with the aqueous medium, the rate at which the active material is released into the medium is determined by the dissolution rate of the glass.

4,587,268

TREATMENT OF OSTEITIS

Rolf W. Pfirrmann, Lucerne, Switzerland, assignor to Ed. Geistlich Sohne A.G. fur Chemische Industrie, Lucerne, Switzerland

Continuation of Ser. No. 298,889, Sep. 2, 1981, abandoned. This application Mar. 8, 1984, Ser. No. 587,707

Claims priority, application United Kingdom, Sep. 3, 1980, 8028482

Int. Cl.[4] A01N *25/00, 63/02*

U.S. Cl. 514—774 **9 Claims**

1. A composition for the treatment of osteitis comprising a flexible solid in granular form adapted to be introduced into a bone cavity, the said solid comprising a resorbable aqueous gel of one or more cross-linked fibrous proteins having dissolved or dispersed therein an antibacterially effective amount of one or more water-soluble antibacterial medicaments.

6. A composition as claimed in claim 1 wherein the flexible solid is in the form of a granulate in admixture with spongiosa tissue.

4,587,269

ONE STEP PROCESS FOR PREPARING ANION EXCHANGE POLYMERS

Martin Thomas, Jr., Southbridge, Mass., assignor to Ionics Incorporated, Watertown, Mass.

Filed Sep. 16, 1985, Ser. No. 776,301

Int. Cl.[4] C08F *2/06;* **C25B** *13/08*

U.S. Cl. 521—38 **8 Claims**

8. A method of preparing an anion exchange polymer comprising reacting a mixture of a polar solvent selected from the group consisting of methanol, ethanol, 1-propanol, 1-butanol, 1-pentanol and water mixtures thereof, a cross-linking monomer of ethylene glycol dimethacrylate with the quaternized product of dimethylaminoethyl methacrylate or diethylaminoethyl methacrylate with methyl chloride, said reaction occurring by heating the mixture in the presence of a polymerization initiator.

4,587,270

PRELIMINARILY FOAMED PARTICLES OF NON-CROSSLINKED POLYPROPYLENE-TYPE RESIN

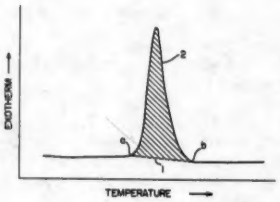
Hideki Kuwabara, Hadano, and Yoshimi Sudo, Chigasaki, both of Japan, assignors to Japan Styrene Paper Corporation, Tokyo, Japan

Filed Nov. 21, 1984, Ser. No. 673,917

Claims priority, application Japan, Nov. 21, 1983, 58-219134

Int. Cl.[4] C08J *9/22*

U.S. Cl. 521—58 **5 Claims**



1. Preliminarily foamed particles of a non-crosslinked polypropylene resin based on an alpha-olefin having 4 to 6 carbon atoms/propylene random copolymer having an amount of the heat of crystallization in the range of 5 to 15 cal/g, said preliminarily foamed particles having such a crystal structure that when a DSC curve is drawn by heating 1 to 3 mg of the preliminarily foamed particles to 220° C. at a rate of 10° C./min. by means of a differential scanning calorimeter, a high temperature peak is observed at a higher temperature than the temperature of the peak inherent to the base resin.

4,587,271

POLYMER FOAM, THERMOFORMED SHAPES THEREOF AND METHODS OF FORMING SAME

Charles M. Krutchen, Pittsford, and Wen-Pao Wu, Victor, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 560,641, Dec. 12, 1983. This application Jun. 18, 1984, Ser. No. 622,024

Int. Cl.[4] C08J *9/18*

U.S. Cl. 521—60 **5 Claims**

1. A composition comprising discrete particles of a polye-

therimide imbibed with a solvent member selected from the group consisting of methylene chloride, chloroform, 1,1,2-trichloroethane and mixtures thereof said imbibed particles being in at least substantially free flowable form, said solvent being present in a quantity sufficient to foam said resin to a density less than about 20 lbs/ft^3.

4,587,272

FOAMABLE POLYCARBONATE COMPOSITIONS, ARTICLES AND METHODS

Roger W. Avakian, Pittsfield, Mass., and Ronald E. Jodice, Florence, S.C., assignors to General Electric Company, Pittsfield, Mass.

Filed Oct. 1, 1984, Ser. No. 656,595
Int. Cl.^{4} C08J *9/10*
U.S. Cl. 521—86 **14 Claims**

1. A foamable thermoplastic composition substantially free of fibrous fillers, said composition comprising

(a) an aromatic polycarbonate, an aromatic polyester carbonate, an aromatic dihydric sulfone carbonate, or a mixture of any of the foregoing, in combination with

(b) a polyester resin comprising units of an aliphatic diol, a cycloaliphatic diol, or a mixture of said diols and an aromatic diacid or a cycloaliphatic diacid,

(c) a minor effective amount of a foaming agent; and

(d) from about 0.1 to about 5.0 parts by weight of a non-fibrous particulate foam nucleating agent substantially insoluble in the composition and consisting of a particulate acrylate polymer, the amounts of (c) and (d) being sufficient to provide a rigid substantially void-free, substantially uniform cellular core within a solid integral skin, said composition also including a surface active agent compound comprising a silicone, a polyglycol ether, a fatty acid derivative or a mixture of any of the foregoing in an amount sufficient to help particulate dispersion and to reduce surface tension.

4,587,273

METHOD FOR MANUFACTURING FLAME-RETARDANT POLYURETHANE FOAM

Kenji Shimomura, Yokohama, Japan, assignor to Ikeda Bussan Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1985, Ser. No. 764,841
Claims priority, application Japan, Aug. 11, 1984, 59-168482
Int. Cl.^{4} C08G *18/14*
U.S. Cl. 521—107 **18 Claims**

1. A method for manufacturing a flame-retardant polyurethane foam comprising the steps of:

mixing a polyether polyol, an organic polyisocyanate, water, a surfactant, a catalyst containing a metal and a tertiary amine catalyst to form a mixture; and reacting said mixture to form a polyurethane foam,

the improvement wherein 1 to 15 parts by weight of a triarylphosphate and 1 to 15 parts by weight of a complex salt consisting of a sintered mixture comprising silico-zirconate and antimony oxide are added to said mixture based on 100 parts by weight of said polyether polyol, respectively.

4,587,274

PROCESS FOR PREPARATION OF FLUORINE-CONTAINING COMPOUND HAVING CARBOXYL GROUP

Akihiko Nakahara, Yamaguchi; Toshikatsu Sata; Masaki Shirouzu, both of Tokuyama, and Kenji Kunai, Ayase, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Japan

Continuation of Ser. No. 409,868, Aug. 20, 1982, abandoned. This application Nov. 26, 1984, Ser. No. 674,485
Claims priority, application Japan, Aug. 24, 1981, 56-131646
Int. Cl.^{4} C08J *3/28*; C08F *8/06*
U.S. Cl. 522—126 **11 Claims**

1. A process for the preparation of a fluorine-containing compound having a carboxyl group, which comprises irradiating a fluorine-containing compound having a sulfonyl group selected from the group consisting of a sulfonic acid group, an ammonium salt of a sulfonic acid group and a sulfonic acid amide group, with ultraviolet rays in the presence of a nitrogen oxide.

4,587,275

PROCESS FOR THE PREPARATION OF POLYURETHANE ELASTOMERS

Richard Kopp, Cologne; Holger Meyborg, Odenthal; Gerhard Grögler, Leverkusen, and Jürgen Schwindt, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

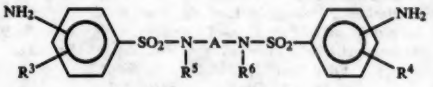
Continuation of Ser. No. 243,011, Mar. 12, 1981, abandoned. This application Sep. 30, 1982, Ser. No. 429,707
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1980, 3012864
Int. Cl.^{4} C08G *18/14*
U.S. Cl. 521—163 **13 Claims**

1. A process for the production of a polyurethane urea elastomer by reacting

(a) a polyisocyanate,

(b) a compound containing at least two isocyanate reactive hydrogen atoms and having a molecular weight of from 400 to 10,000, and

(c) an aromatic diamine corresponding to the formula



in which

R^3 and R^4 (which may be the same or different) represent hydrogen, a straight or branched chain alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms, or a halogen atom; and

R^5, R^6 and A together represent a piperazine ring

in which the diamine (c) is used in a quantity such that the diamine (c) represents a mole fraction within the range of 1 to 0.5 of chain lengthening agent employed.

4,587,276

POLYPHOTOINITIATORS

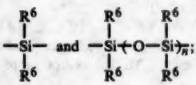
Qcheng S. Lien, S. Windsor, Conn., and Robert W. R. Humphreys, Bergenfield, N.J., assignors to Loctite Corporation, Newington, Conn.

Continuation-in-part of Ser. No. 505,588, Jun. 20, 1983, Pat. No. 4,477,326. This application Aug. 31, 1983, Ser. No. 528,287
Int. Cl.^{4} C08F *2/46*; C08L *51/08*
U.S. Cl. 522—34 **29 Claims**

1. A polyphotoinitiator comprising the hydrosilation reaction product of a host polymer having olefinic or acetylenic unsaturation with at least one grafting agent represented by the formula

$$(hv)—R^8—R^5—H$$

wherein (hv) is a photoinitiating aromatic-aliphatic ketone group, R^5 is selected from



R^6 are the same or different organo or halo groups; n is an integer; and R^8 is selected from alkylene, alkenylene, alkyleneoxy and oxy groups.

9. A polyphotoinitiator as defined in claim 1 in a composi-

tion, said composition further comprising at least one free radical curable compound.

4,587,277

RADIATION SHIELD

Shinobu Sato, Matsudo, Japan, assignor to Yukiyasu Unno, Japan

Filed Nov. 21, 1983, Ser. No. 553,622
Claims priority, application Japan, Apr. 4, 1983, 58-57955
Int. Cl.[4] C08K 3/22; G21F 1/10, 1/08, 3/04
U.S. Cl. 523—136 8 Claims

1. A molded radiation shield comprising a thermosetting resin-bonded mixture of powders having the following composition

30 to 60% lead oxide,

10 to 30% slag derived from the electro-refining of aluminum,

5 to 15% of molybdenite, said percentages being by weight based upon the total weight of the composition, and

sufficient resin to bind the powders together to form said shield.

4,587,278

SOUND-INSULATING BOARDS BASED ON MINERAL FIBERS AND THERMOPLASTIC BINDERS

Bernhard Dotzauer, Maxdorf; Hans Kast, Mannheim; Gernot Franzmann, Bobenheim; Gregor Ley, Wattenheim; Wilhelm F. Beckerle, Bobenheim-Roxheim, and Wolfgang Schilder, Dirmstein, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 12, 1984, Ser. No. 599,575
Int. Cl.[4] C08K 7/12, 7/10, 9/02
U.S. Cl. 523—200 11 Claims

1. A sound-insulating board which comprises mineral fibers and a thermoplastic binder, wherein said board contains as the binder from 4 to 20%, based on the weight of the mineral fibers, of a polymer having a glass transition temperature of from 38° to 80° C. and consisting of from 60 to 100% by weight of (meth)acrylates of alkanols of 1 to 4 carbon atoms and from 0 to 40% by weight of acrylonitrile and/or styrene, the percentages being based on the copolymer.

4,587,279

CEMENTITIOUS BUILDING MATERIAL INCORPORATING END-CAPPED POLYETHYLENE GLYCOL AS A PHASE CHANGE MATERIAL

Ival O. Salyer, Dayton, and Charles W. Griffen, Mason, both of Ohio, assignors to University of Dayton, Dayton, Ohio

Filed Aug. 31, 1984, Ser. No. 646,396
Int. Cl.[4] C04B 24/32, 24/34; C08K 9/00, 9/10
U.S. Cl. 523—206 19 Claims

1. A cementitious composition useful in the manufacture of building materials comprising an inorganic cementitious building material and an end-capped polyethylene glycol dispersed therein as a phase change material, said end-capped polyethylene glycol having a molecular weight greater than about 400 and a heat of fusion greater than about 30 cal/g, wherein said end-capped polyethylene glycol is selected from the group consisting of alkoxy-capped polyethylene glycol, urethane-capped polyethylene glycol, and ester-capped polyethylene glycol.

4,587,280

TANK TREAD PAD AND COMPOSITION FOR MAKING

Probir K. Guha, Mount Clemens; Kenneth A. Iseler, Richmond, and Robert C. Yen, Troy, all of Mich., assignors to Budd Company, Troy, Mich.

Filed Mar. 4, 1983, Ser. No. 472,357
Int. Cl.[4] B62D 55/205; C08K 7/02
U.S. Cl. 523—222 9 Claims

1. A track pad for a track laying device having an endless track of articulated metal track shoes, said pad being adapted to be held within a track show with one face exposed to prevent contact between the metal track shoe and the road over which the track is moving, said track pad comprising: a first urethane resinous material formed by the reaction of an isocyanate terminated prepolymer having an isocyanate functionality greater than 2 and a polyol, said urethane reaction being catalyzed by an oramatic co-curing agent said curing agent having the capacity to immediately begin catalyzing the isocyanate terminated prepolymer at room temperature to a solid material and continuing to catalyze the urethane reaction at room temperature as the resin mixture ages; a second resinous component chosen from the class consisting of polyester resins, epoxy resins, vinyl-ester resins, phenolic resins, polystyrene resins and isocyanurates separate and distinct from said urethane component, said second resins system being adapted to cure only when the second resin reaches a curing temperature of about 200°-350° F. and being substantially unreactive with said urethane resin so that curing of said resins produces an interpenetrating resin matrix and a fiberous filler material in the resin matrix.

4,587,281

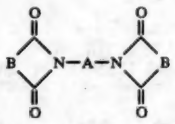
MODIFIED THERMOSETTING IMIDE RESINS WITH IMPROVED FRACTURE TOUGHNESS

Horst Stenzenberger, Schriesheim, Fed. Rep. of Germany, assignor to The Boots Company PLC, England

Division of Ser. No. 437,794, Oct. 29, 1982, Pat. No. 4,520,145.
This application Feb. 28, 1985, Ser. No. 706,613
Claims priority, application United Kingdom, Jul. 21, 1982, 8221116
Int. Cl.[4] C08G 18/00
U.S. Cl. 523—500 15 Claims

1. Curable bisimide resins comprising a mixture of

(a) a bisimide of the general formula (I)



(I)

in which B represents a divalent radical containing a carbon-carbon double bond and A is a divalent radical containing at least two carbon atoms and

(b) a polyisocyanate of the general formula (II)

$$D(NCO)_x \quad \text{(II)}$$

in which x has a value in the range 2 to 4 and D stands for an x-valent radical, the molar ratio a:b being greater than 5.25.

4,587,282

POLYESTER LAMINATING COMPOSITIONS WITH IMPROVED INTERLAMINAR ADHESION

Peter L. Mena, Guelph, Canada, assignor to Fiberglas Canada Inc., Sarnia, Canada

Filed Jun. 19, 1984 Ser. No. 622,161
Claims priority, application Canada, Feb. 10, 1984, 447196
Int. Cl.[4] C08K 5/10, 5/20, 5/01; C08L 67/06
U.S. Cl. 523—508 17 Claims

1. A polyester laminating composition comprising:

(a) a highly reactive unsaturated polyester including a volatile reactive monomer as cross-linking agent and a wax for reducing evaporation of said volatile reactive monomer; and

(b) 0.1% to 4% by weight, based on the total weight of the composition, of a polyvinyl acetate having a molecular weight of between about 35,000 and 260,000.

5. A polyester laminating composition comprising:

(a) an unsaturated polyester including a volatile reactive monomer as a cross-linking agent and a wax for reducing evaporation of said volatile reactive monomer;
(b) 0.1% to 4% by weight, based on the total weight of the composition, of a polyvinyl acetate having a molecular weight of between about 35,000 and 260,000; and
(c) 0.1% to 2% by weight, based on the total weight of the composition, of a mixture of 80% of a salt of a long chain polyaminoamide and an ester of linoleic acid, said salt having a molecular weight approximately three times that of the oleylamine salt of linoleic acid and 20% of ethylene glycol monobutyl ether.

4,587,283

CEMENT SLURRIES FOR DEEP HOLES, WITH A COPOLYMER CONTENT FOR REDUCING THE WATER LOSS

Martin Hille, Liederbach; Wolfgang Friede, Eschborn; Heinz Wittkus, Frankfurt am Main; Friedrich Engelhardt, Frankfurt am Main, and Ulrich Riegel, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

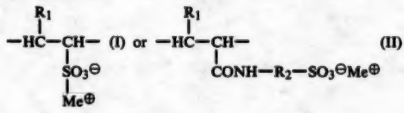
Continuation of Ser. No. 572,648, Jan. 20, 1984, abandoned. This application Apr. 3, 1985, Ser. No. 719,023

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1983, 3302168

Int. Cl.[4] C08J *3/00*

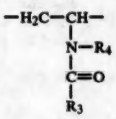
U.S. Cl. 524—3 **4 Claims**

1. A cement slurry comprised of water and cement, which comprises a copolymer comprised of:
(a) 10–80% by weight of groups of the formula



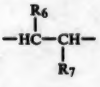
(I) or (II)

in which
R_1 is hydrogen or methyl,
R_2 is C_2–C_{10}-alkylene and
Me is ammonium, lithium, sodium or potassium;
(b) 10–60% by weight of groups of the formula



(III)

in which
R_3 is hydrogen, $-CH_3$ or $-C_2H_5$ and
R_4 is $-CH_3$ or $-C_2H_5$; and
(c) 0–75% by weight of groups of the formula



(IV)

in which
R^6 is hydrogen or methyl and
R^7 is carboxamido, carboxyl, cyano or carbomethoxy.

4,587,284

ABSORBENT POLYMER MATERIAL AND ITS PREPARATION

Heinz Lüssi, Chur, and Peter Geistlich, Stansstad, both of Switzerland, assignors to Ed. Geistlich Sohne AG fur Chemische Industrie, Lucerne, Switzerland

Filed Jun. 14, 1985, Ser. No. 744,615

Int. Cl.[4] C08F *299/00*

U.S. Cl. 524—17 **14 Claims**

1. A process for preparing a hydrophilic polymer material in which a water-containing organic hydrogel comprising a gelable polysaccharide and/or protein or polypeptide interspersed with a polymer of a hydrophilic acrylic or methacrylic acid derivative is permeated with a base, the pH of said hydrogel being raised to at least 9 during treatment with said base, whereby the ability of said hydrogel to retain or absorb aqueous media is increased.

4,587,285

AQUEOUS HEAT-CURABLE COMPOSITIONS, AND THEIR USE

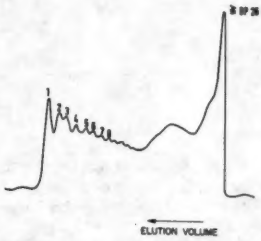
Cihan Ayla, Hamburg, Fed. Rep. of Germany; Hans-Hermann Dietrichs, deceased, late of Reinbek, Fed. Rep. of Germany (by Magda M. U. Dietrichs, Daniel Dietrichs, Stephan Dietrichs, heirs); Jürgen Puls, Reinbek, and Michael Sinner, Mainz, both of Fed. Rep. of Germany, assignors to Fritz-Werner Industrie-Ausruestungen GmbH, Geisenheim, Fed. Rep. of Germany

Filed Apr. 7, 1983, Ser. No. 482,789

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1982, 3213159

Int. Cl.[4] C08L *61/00, 1/02*

U.S. Cl. 524—78 **19 Claims**



1. An aqueous heat-curable admixture consisting essentially of
(a) an unreacted water-soluble hemicellulose-cleavage product having an average degree of polymerization of 5 to 100 in an amount of at least 10% by weight, relative to the total weight of heat-curable materials comprising said composition,
(b) at least one aldehyde in an amount of 5 to 50% by weight, relative to the weight of the hemicellulose-cleavage products, and
(c) at least one heat-curable condensation product of an aldehyde and an —OH and/or $-NH_2$ containing compound.

4,587,286

DISPERSION OF POLY(ETHYLENE TETRAFLUOROETHYLENE)

James Wilkinson, P.O. Box 26, Williamstown, W. Va. 26187

Filed Mar. 12, 1984, Ser. No. 588,201

Int. Cl.[4] C08K *5/06*

U.S. Cl. 524—375 **4 Claims**

1. A dispersion of poly(ethylene tetrafluoroethylene) comprising:

from about 20 to about 75 parts by weight of the poly(ethylene tetrafluoroethylene);
from about 7 to about 23 parts by weight of a glycerine;
from about 2 to about 17 parts by weight of an alkyl phenol ethylene oxide condensate product having from about 9 to about 15 moles of ethylene oxide condensates;
from about 30 to about 80 parts by weight of water; and
from about 0.1 to about 3.0 parts by weight of an ethylene glycol monobutyl ether and about 7 to about 30 parts by weight of a hydrocarbon solvent having from 6 to 12 carbon atoms such that a dispersion is formed, and about 0.1 to about 1.0 parts by weight of an anti-sag agent.

4,587,287

COATING COMPOSITION

Koichi Matsuda; Shohei Tamaki; Hiroshi Harada; Masami Nakashima, and Makoto Fujiyoshi, all of Omuta, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1984, Ser. No. 685,835
Int. Cl.[4] C08K *3/38*
U.S. Cl. 524—404 **6 Claims**

1. A coating composition comprising from 20 to 60 parts by weight of component (A) of a powder composition composed essentially of from 30 to 80% by weight of boron nitride, from 1 to 18% by weight of a low melting point glaze, the rest being an inorganic pigment, and from 40 to 80 parts by weight of component (B) of a liquid composition composed essentially of from 20 to 60% by weight of a silicone resin, the rest being an organic solvent in which the silicone resin is dissolved.

4,587,288

SILICONE WATER-BASED PUTTY

Myron T. Maxson, and Christine J. Schoenherr, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 2, 1985, Ser. No. 729,834
Int. Cl.[4] C08K *3/26*
U.S. Cl. 524—425 **7 Claims**

1. A silicone composition consisting essentially of the product obtained by mixing

(A) 100 parts by weight of an anionically stabilized, hydroxyl endblocked polydiorganosiloxane having a weight average molecular weight of above 50,000, the organic radicals being monovalent hydrocarbon radicals containing less than 7 carbon atoms or 2-(perfluoroalkyl)ethyl radicals having less than 7 carbon atoms per radical, present as an emulsion of dispersed particles in water, the emulsion having a pH of greater than 9 and a solids content of greater than 50% by weight,

(B) from 0.05 to 0.4 part by weight of dialkyltindicarboxylate,

(C) from 1 to 12 parts by weight of phenyltrimethoxysilane, and

(D) from 50 to 200 parts by weight of inert, nonsiliceous filler having an average particle size of less than 2 micrometers,

to produce a material having a paste viscosity which, when the water is removed, has a plasticity number of from 125 to 300, is insoluble in water, and does not harden appreciably on aging.

4,587,289

ADHESIVE THERMOPLASTIC COMPOSITIONS

Ahmet Comert, 102h, rue Houlteau, 4655 Chaineux, and Dominique Petit, 60, rue de Housse, 4512 Housse-Blegny, both of Belgium

Filed Sep. 26, 1983, Ser. No. 535,827
Claims priority, application France, Sep. 27, 1982, 82 16218
Int. Cl.[4] C08L *77/12, 9/00*
U.S. Cl. 524—505 **6 Claims**

1. A thermoplastic, thermofusible adhesive composition comprising as essential elements:

(1) 100 parts of a butyl rubber having a Mooney viscosity (ML 1+3 at 127° C.) of 30 to 80,

(2) 50 to 1000 parts resinous constituents comprising:

(a) an adhesion improving amount up to 300 parts terpene-phenolic resin having a softening point (ring and ball) of up to 200° C.;

(b) a sag resistance improving amount up to 200 parts ethylene-vinyl acetate copolymer having a melt flow index of not more than 700; and

(c) 0 to 500 parts aliphatic hydrocarbon resin, coumarone-indene resin, or a combination thereof having a softening point (ring and ball) of about 100° C.;

(3) 1 to 300 parts of a block copolyetheresteramide consisting of a product resulting from the polyconsendation of an α, ω-dicarboxylic polyamide or copolyamide having a number average molecular weight of 300 to 15,000, employed in an amount of 90 to 5% by weight and of an aliphatic α, ω-dihydroxylated polyoxyalkylene having a number average molecular weight of 100 to 6,000, employed in an amount of 10 to 95% weight, the said polycondensation product having a softening point (ring and ball) of between 80° and 210° C. and a viscosity in the molten state of 10 to 2,000 Pa.s (200° C.);

(4) an adhesion improving amount up to 500 parts of polyisobutylene having a number average molecular weight of at most 50,000; and

(5) a reinforcing amount up to 300 parts of fillers.

4,587,290

POLYMERIZATION PROCESS USING NONIONIC SURFACTANT AND COPOLYMERIZABLE UNSATURATED POLYETHYLENE GLYCOL

Stephen P. Davies, Melbourne, Australia, and Morice W. Thompson, Maidenhead, England, assignors to Imperial Chemical Industries PLC, London, England

Filed Sep. 19, 1983, Ser. No. 533,816
Claims priority, application United Kingdom, Oct. 1, 1982, 8228046; Oct. 1, 1982, 8228151
Int. Cl.[4] C08L *31/00*; C08F *2/00*
U.S. Cl. 524—558 **12 Claims**

1. A polymerisation process in which at least one ethylenically unsaturated monomer, having a solubility in water in the range 0.08%–8% by weight but giving rise to a polymer which is insoluble in water, is emulsified in water and is subjected in that state to polymerisation in the presence of (a) a redox-type polymerisation initiator system comprising hydrogen peroxide in combination with a non-ionic water-soluble activator compound, (b) 0.5% to 10%, by weight of the monomer to be polymerized, of a conventional non-ionic surfactant and (c) 0.5 to 20%, by weight of the monomer to be polymerized, of a precursor compound the molecule of which consists of (i) a polyethylene glycol chain which has a molecular weight of 500 to 4,000 and (ii) attached to said chain at least one unsaturated grouping selected from the group consisting of methacrylate and allyl.

4,587,291

MULTICOMPONENT AQUEOUS RESOLE BINDER WITH EXTENDED PROCESSABILITY TIME

Arno Gardziella, Witten; Karl-Heinz Schwieger, Iserlohn; Peter Adolphs, Iserlohn, and Gerhard Grossmann, Iserlohn, all of Fed. Rep. of Germany, assignors to Rütgerswerke Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Division of Ser. No. 652,681, Sep. 20, 1984, abandoned. This application Apr. 25, 1985, Ser. No. 727,038

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1983, 3335933

Int. Cl.[4] C08G *8/28, 8/30, 8/34*

U.S. Cl. 524—595 14 Claims

1. A binder composition comprising in aqueous solution an acid curing phenol resin component and at least one acid curing agent therefore, wherein the resin is an aqueous phenol resol with a mole ratio of the phenol to aldehyde of 1:1.1 to 1:3.0 and a content of monomeric phenol of less than 5% and, wherein the curing agent is an addition product of a hydroxy group containing, water compatible polyol having an OH number in the range of 50 to 500 with an aromatic sulfonic acid.

4,587,292

SULFO GROUP-FREE AZO COMPOUNDS HAVING ON AVERAGE AT LEAST 1.3 BASIC WATER-SOLUBILIZING GROUPS IN METAL-FREE, 1:1 METAL COMPLEX OR 1:2 METAL COMPLEX FORM

Paul Doswald, Münchenstein; Emil Moriconi, Basel; Helmut Moser, Oberwil, and Horst Schmid, Reinach, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

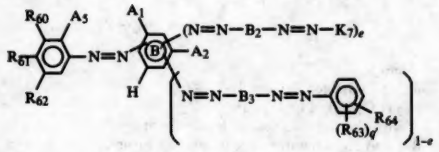
Division of Ser. No. 402,407, Jul. 27, 1982, abandoned, which is a continuation-in-part of Ser. No. 391,261, Jun. 23, 1982, abandoned, which is a continuation-in-part of Ser. No. 261,318, May 7, 1981, abandoned. This application Aug. 18, 1982, Ser. No. 409,299

Claims priority, application Switzerland, May 8, 1980, 3601/80; May 8, 1980, 3602/80; May 8, 1980, 3603/80; May 8, 1980, 3604/80; May 8, 1980, 3605/80; May 8, 1980, 3606/80; May 13, 1980, 3735/80; May 13, 1980, 3736/80; May 13, 1980, 3737/80; May 29, 1980, 4183/80; May 29, 1980, 4184/80; May 29, 1980, 4185/80; Jul. 1, 1980, 5079/80; Jul. 1, 1980, 5080/80; Jul. 1, 1980, 5081/80; Dec. 10, 1980, 9104/80; Dec. 10, 1980, 9106/80; Dec. 10, 1980, 9107/80

Int. Cl.[4] C09B *44/02, 44/04, 44/06, 44/08*

U.S. Cl. 534—606 24 Claims

1. A compound of the formula



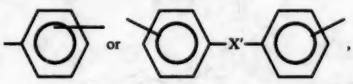
wherein

A_1 is —OH or —NH_2,

A_2 is —OH or —NH_2,

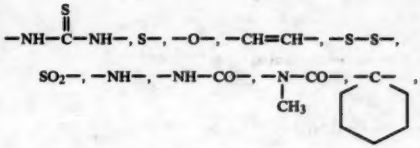
A_5 is —OH, —COOH or C_{1-4}alkoxy,

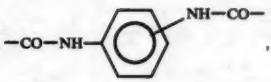
B_2 is

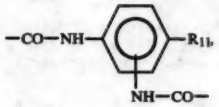


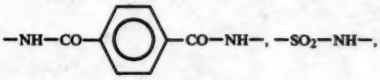
wherein

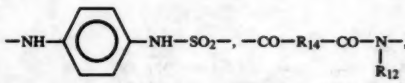
X' is a direct bond, straight or branched C_{1-4}alkylene, —CO—,

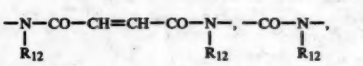


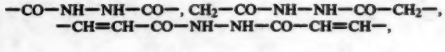


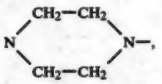


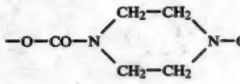


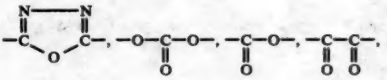


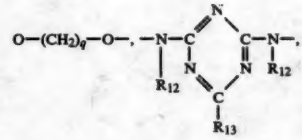


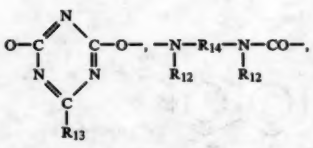












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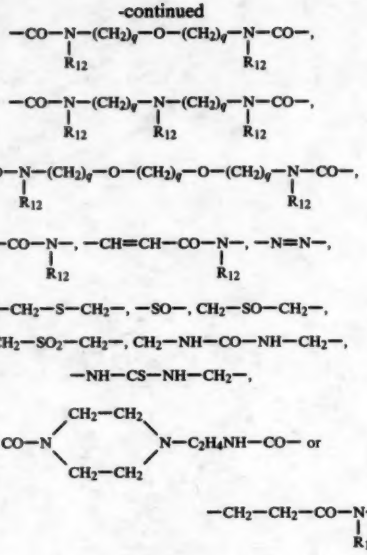


wherein

R_{11} is halo, C_{1-4}alkyl or C_{1-4}alkoxy,

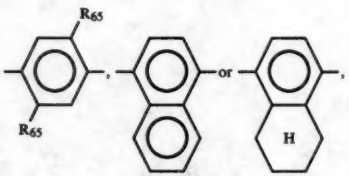
each R_{12} is independently hydrogen or C_{1-4}alkyl,

R_{13} is halo, $-NHCH_2CH_2OH$ or $-N(CH_2CH_2OH)_2$,

R_{14} is straight or branched C_{1-4}alkylene, and

each q is independently 1, 2, 3 or 4,

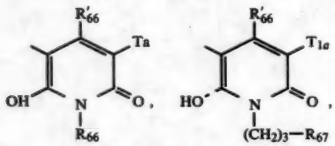
B_3 is

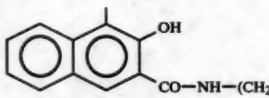


wherein

each R_{65} is independently hydrogen, C_{1-4}alkyl or C_{1-4}alkoxy,

K_7 is





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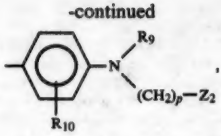
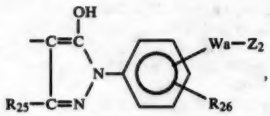
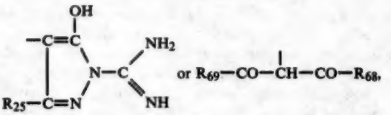






wherein

R_9 is C_{1-4}alkyl or $-(CH_2)_p-Z_2$,

R_{10} is hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, acetamido or ureido,

R_{25} is C_{1-4}alkyl, (C_{1-4}alkoxy)carbonyl or carboxy,

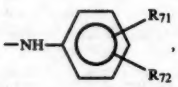
R_{26} is hydrogen, halo, C_{1-4}alkyl or C_{1-4}alkoxy,

R_{66} is hydrogen, C_{1-4}alkyl, 2-hydroxyethyl or $-(CH_2)_p-Z_2$,

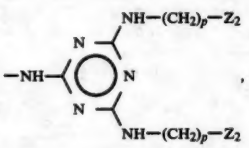
R_{66}' is C_{1-4}alkyl,

R_{67} is $-N(CH_3)_2$ or $-N^{\oplus}(CH_3)_3\ A^{\ominus}$,

R_{68} is $-CH_2)_p-Z_2$, $-NH-(CH_2)_p-Z_2$ or



wherein R_{71} is hydrogen, hydroxy, C_{1-4}alkoxy, $-NH-CO-(CH_2)_p-Z_2$, $-CO-NH-(CH_2)_p-Z_2$, $-SO_2-NH-(CH_2)_p-Z_2$, $-(CH_2)_p-Z_2$ or



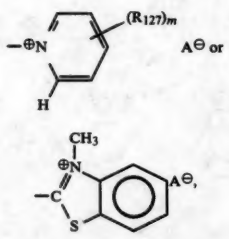
and

R_{72} is hydrogen or $-(CH_2)_p-Z_2$,

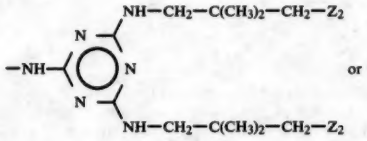
R_{69} is C_{1-4}alkyl or $-(CH_2)_p-Z_2$,

with the proviso that at least one of R_{68} and R_{69} contains at least one Z_2 group,

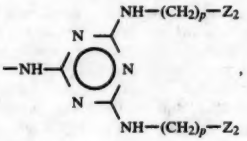
Ta is



wherein R_{127} and m are as defined below,
T_{1a} is —CN or —$CONH_2$, and
Wa is —$(CH_2)_s$—, —NHCO—$(CH_2)_2$—, —CONH—$(CH_2)_2$—* or —SO_2NH—(CH_2)*, wherein the * indicates the end bound to the nitrogen atom of the Z_2 group, and
s is 1, 2, 3, 4, 5 or 6,
R_{60} is hydrogen or nitro,
each of R_{61} and R_{62} is independently hydrogen, nitro, —CH_2—Z_2, —SO_2—NH_2, —SO_2—NH—$(CH_2)_p$—Z_2, —SO_2—NH—C_2H_4OH, —SO_2—$N(R_{62}')_2$, —CO—NH—$(CH_2)_p$—Z_2, —NH—CO—$(CH_2)_p$—Z_2,

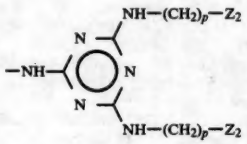


or

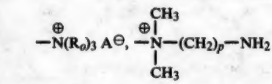


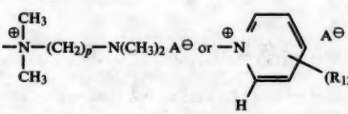
,

wherein
each R_{62}' is independently C_{1-4}alkyl,
each R_{63} is independently —SO_2—NH—$(CH_2)_p$—Z_2, —CO—NH—$(CH_2)_p$—Z_2, —NH—CO—$(CH_2)_p$—Z_2,



or —CH_2—Z_2,
R_{64} is hydrogen or C_{1-4}alkoxy,
both e's are 0 or 1, and
q' is 1 or 2, with the proviso that q' must be 2 when an R_{63} is —CONH—$(CH_2)_p$—Z_2,
wherein each Z_2 is independently —NH_2, —$N(R_o)_2$,





,

wherein
each R_o is independently methyl, ethyl, 2-hydroxyethyl, benzyl, acetylmethyl or benzoylmethyl, with the proviso that no nitrogen atom contains more than one member of the group consisting of benzyl, acetylmethyl and benzoylmethyl, and no nitrogen atom contains more than two 2-hydroxyethyl groups,
each R_{127} is independently methyl or ethyl, and
m is 0, 1 or 2, and
each $A^{\oplus}$ is independently a non-chromophoric anion, and
each p is independently 1, 2 or 3, with the provisos that (i) the compound contains at least two basic water-solubilizing groups, (ii) at least one of R_{60} and R_{61} is other than nitro, (iii) R_{60} is hyrogen when both R_{61} and R_{62} are hydrogen, (iv) R_{61} and R_{62} are different or both are hydrogen, and (v) each azo radical attached to ring B' is ortho to A_1 or A_2 or to both A_1 and A_2.

4,587,293

REACTIVE FLEXIBILIZING MONOMER AND THERMOSETTABLE COMPOSITIONS CONTAINING SAME

Robert E. Hefner, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 582,663, Feb. 24, 1984, abandoned, which is a division of Ser. No. 484,040, Apr. 11, 1983, abandoned. This application Jan. 23, 1985, Ser. No. 694,553

Int. Cl.[4] **C08L** *67/06, 77/12, 63/10*

U.S. Cl. 525—49 **6 Claims**

1. A composition which when admixed with a suitable quantity of a free radical forming catalyst stem therefor thermosets to a cured condition, which composition comprises
(A) an unsaturated polyester resin, an unsaturated polyesteramide resin, norbornyl modified unsaturated polyester resin, norbornyl modified unsaturated polyesteramide resin, vinyl ester resin or mixture of any of such resins in any combination;
(B) at least one ethylenically unsaturated monomer resulting from reacting
(1) an aromatic material containing, per molecule, only one polymerizable ethylenically unsaturated group and only one group containing an ether linked epoxide group; and
(2) a material containing at least one oxyalkylene group and is terminated in a group having at least one hydrogen atom which is reactive with an ether linked epoxide group and which hydrogen atom is not attached to an oxygen atom which is attached to an aromatic ring; and wherein the components are employed in quantities which provides an equivalent ratio of A:B of from about 0.1:1 to about 6:1; and
(C) a polymerizable ethylenically unsaturated nonresinous monomer different from Component (B) and wherein
(1) Component (A) is present in a quantity of from about 1 to about 99 percent by weight of the combined weight of Components (A), (B) and (C);
(2) Component (B) is present in quantities of from about 1 to about 95 percent by weight of the combined weight of Components (A), (B) and (C); and
(3) Component (C) is present in quantities of from zero to about 99 percent by weight of the combined weight of Components (A), (B) and (C).

4,587,294

CONTINUOUS PROCESS FOR PRODUCING RUBBER MODIFIED HIGH-IMPACT RESINS

Tetsuyuki Matsubara; Norifumi Ito, both of Yokohama; Kouzo Ichikawa, Hatano; Kouichi Arahari, Zama, and Tetsuo Maeda, Urayasu, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc. and Toyo Engineering Corporation, both of Tokyo, Japan

Filed Oct. 25, 1983, Ser. No. 545,167

Claims priority, application Japan, Nov. 4, 1982, 57-192574

Int. Cl.[4] **C08F** *279/04;* **C08L** *55/02*

U.S. Cl. 525—53 **2 Claims**

1. A continuous bulk or solution polymerization process for producing rubber modified high-impact resins which comprises continuously feeding a raw material solution including a mixture of an aromatic vinyl monomer and vinyl cyanide monomer and a rubber component dissolved in said mixture, together with a radical polymerization initiator, to a first reactor, polymerizing said raw material solution under high-shear agitation to the conversion required to transform the rubber component phase into dispersed particles, withdrawing the

reaction mixture continuously from said first reactor at a rate corresponding to the feed rate of said raw material solution, and feeding said reaction mixture to a second or more reactors for further polymerization, the process being characterized in that

(a) the weight ratio of said aromatic vinyl monomer to said vinyl cyanide monomer present in said raw material solution ranges from 99/1 to 50/50;

(b) said rubber component is a polybutadiene and has a viscosity of not greater than 100 centistokes when measured as a 5% solution in styrene at 30° C.;

(c) the content of said rubber component in said raw material solution is not greater than 10% by weight;

(d) the content of a solvent in said raw material solution is not greater than 40% by weight;

(e) said radical polymerization initiator has a 10-hour half-life decomposition temperature of 100° C. or below;

(f) said radical polymerization initiator is fed to said first reactor in an amount of not less than 30 ppm based on said raw material solution; and

(g) the conversion of said monomers at said first reactor is controlled in such a way that it lies between 10 and 30% by weight,

said first reactor includes a screw agitator mounted in a draft tube and provided with an auxiliary agitator at the bottom or a helical-ribbon blade provided with an auxiliary agitator at the bottom and has an inlet port for said raw material solution in the bottom of said first reactor, and wherein the relationship between the agitation speed N, in rps, of said screw agitator or said helical-ribbon blade and the diameter D, in meters, of said screw agitator or said helical-ribbon blade is represented by $N \cdot D > 1.0$.

4,587,295

POLYCARBONATE COMPOSITION

Harold F. Giles, Jr., Cheshire, and Robert P. Hirt, Jr., Lenox, both of Mass., assignors to General Electric Company, Mt. Vernon, Ind.

Filed Jan. 2, 1985, Ser. No. 688,248

Int. Cl.[4] C08L *69/00*

U.S. Cl. 525—57 **21 Claims**

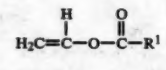
1. Polycarbonate composition comprising, in physical admixture:

(i) from about 10 to about 96 weight percent of at least one high molecular weight aromatic thermoplastic polycarbonate resin;

(ii) from about 2 to about 35 weight percent of at least one olefin vinyl alcohol copolymer; and

(iii) at least one material selected from

(a) about 2 to about 35 weight percent of olefin vinyl ester copolymer comprising the polymerized reaction products of at least one lower alpha olefin containing from 2 to 4 carbon atoms and at least one ester monomer represented by the formula



wherein R^1 is selected from hydrogen, alkyl radicals, or aryl radicals; or

(b) about 2 to about 90 weight percent of polyolefin derived from at least one hydrocarbon olefin monomer containing from 2 to about 8 carbons.

4,587,296

ORGANIC THIOSULPHATES AND THIOSULPHONATES USEFUL AS STABILIZING AGENTS FOR RUBBER VULCANISATES

Philippe G. Moniotte, Heron, Belgium, assignor to Monsanto Europe, S.A., Brussels, Belgium

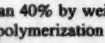
Division of Ser. No. 526,189, Aug. 25, 1983, Pat. No. 4,520,154, which is a division of Ser. No. 393,950, Jun. 30, 1982, Pat. No. 4,417,012. This application Apr. 11, 1985, Ser. No. 722,043

Claims priority, application United Kingdom, Jul. 8, 1981, 8121098; Aug. 13, 1981, 8124716

Int. Cl.[4] C08F *8/00*

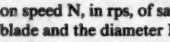
U.S. Cl. 525—61 **21 Claims**

1. A material containing two or more groups of the formula



where M represents a monovalent metal or the equivalent of a multivalent metal, a monovalent ion derived by the addition of a proton to a nitrogenous base, or the equivalent of a multivalent ion derived by the addition of two or more protons to a nitrogenous base, the said material being a compound in which the groups —S—SO_3M are linked by an organic bridging group, or a polymer in which the groups —S—SO_3M are attached to an organic polymer chain; provided that when the material is a compound

in which two such groups are linked by an organic bridging group, M is not —NH_3 or an alkali metal and excluding the compound



where M is S-benzylisothiouronium.

4,587,297

BLENDS OF POLYOLEFIN-VINYL CHLORIDE GRAFT POLYMERS AND CONDENSATION POLYMERS

Leigh E. Walker, Lewiston, and Gautam R. Ranade, Grand Island, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Oct. 12, 1983, Ser. No. 541,195

Int. Cl.[4] C08L *67/00*

U.S. Cl. 525—64 **23 Claims**

1. A polymer composition comprising

a thermoplastic condensation polymer and

a vinyl halide polyolefin graft polymer wherein the vinyl halide alone or in combination with up to 50 percent by weight based on the total weight of monomer of an ethylenically unsaturated compound copolymerizable therewith, and in the liquid state, is polymerized with a polyolefin which comprises a polymer of an aliphatic hydrocarbon olefin of 2 to about 8 carbon atoms, and which is in the solid state and is substantially insoluble in the monomer but absorbs a substantial amount of the monomer.

4,587,298

COMPOSITION COMPRISING A COPOLYESTER-CARBONATE AND A POLYMERIC IMPACT MODIFIER

Kenneth F. Miller, Mt. Vernon, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Continuation of Ser. No. 452,909, Dec. 27, 1982, Pat. No. 4,522,980. This application Feb. 1, 1985, Ser. No. 683,662

Int. Cl.[4] C08L *69/00*

U.S. Cl. 525—67 **8 Claims**

1. A composition comprising in admixture

a. an aromatic copolyester carbonate composition comprising a polymer derived from

i. a dihydric phenol,

ii. a carbonate precursor, and

iii. a further composition providing isophthalate units to the said aromatic copolyestercarbonate composition, wherein the further composition cannot supply more

than 25% terephthalate units to the total ester units of the said aromatic copolyestercarbonate which has from about 25 to about 90 mole percent ester bonds; and

b. an impact modifier comprising a polyolefin, rubbery dienic polymer, or a styrenic polymer, said impact modifier present in quantities which improves the impact properties of the aromatic copolyestercarbonate.

4,587,299

POLYETHERIMIDE BLENDS

Harold F. Giles, Jr., Cheshire, Mass., assignor to General Electric Company, Pittsfield, Mass.

Filed Dec. 29, 1983, Ser. No. 566,659

The portion of the term of this patent subsequent to Jul. 12, 2000, has been disclaimed.

Int. Cl.[4] C08L *79/08, 53/00*

U.S. Cl. 525—92 **7 Claims**

1. A polyetherimide blend comprising from (a) about 50 to about 5 parts by weight of a polyetherimide; (b) 9.4 to 45 parts by weight of a polyester resin; and (c) about 5 to about 20 parts by weight of a block copolymer of a vinyl aromatic compound (A) and an alkene compound (b), of the A—B—A type, the center block being of higher molecular weight than that of the combined terminal blocks.

4,587,300

LOW DENSITY, POLYBUTADIENE BASED, WET FILAMENT WINDING RESIN

Robert H. Valentine, Sandy, Utah, assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 674,448, Nov. 23, 1984, abandoned, which is a division of Ser. No. 554,665, Nov. 23, 1983, Pat. No. 4,499,240. This application Jun. 13, 1985, Ser. No. 744,454

Int. Cl.[4] C08L *53/00*

U.S. Cl. 525—95 **6 Claims**

1. A wet filament winding resin having a viscosity which is between 1,000 and 3,000 centipose at a temperature in a range between 20° and 60° F., a density below about 1.05 grams per cubic centimeter at 25° C. after cure and a pot life which is up to about four months or more at 25° C. where pot life is defined as the time for a winding resin to reach a viscosity of 5,000 centipoise at the winding temperature, said wet filament winding resin being an intimate admixture of components consisting essentially of:

(a) a crosslinkable polymer component in an amount at least about 30% by weight of said resin by weight, said polymer component consisting essentially of unsaturated polybutadiene polymers essentially free of crosslinkable functionality other than the unsaturation thereof, 100 parts by weight of said unsaturated polybutadiene polymers being a first polybutadiene having a number average molecular weight between about 10,000 and 40,000 and a 1,2 vinyl content between about 80 and 95% based on total unsaturation present in said first polybutadiene and between about 5 and 20 parts by weight of a second polybutadiene having a number average molecular weight between about 1,000 and 2,500 and a 1,2 vinyl content between about 35 and 55% based on total unsaturation present in said second polybutadiene;

(b) between about 90 and 130 parts by weight per 100 parts by weight of said first polybutadiene of an unsaturated monomer component that has a lower viscosity than said crosslinkable polymer component, said;

(c) between about 4 and 7.5 parts by weight per 100 parts by weight of said first polybutadiene of an initiator component, said initiator component comprising a first peroxide-free radical initiator that has a 10-hour half life at a first temperature greater than 55° C. and a second peroxide-free radical initiator that has a 10-hour half life at a second temperature greater than 10° C. more than said first temperature; and

(d) between about 2.5 and 35 parts by weight per 100 parts by weight of said first polybutadiene of an impact modifier component comprising a block that has a first block consisting of aromatic-alkylene units and a second block consisting of diene units whereby said block polymer is a thermoplastic elastomer.

4,587,301

METHOD OF USING MIXED ALIPHATIC/AROMATIC POLYCARBODIIMIDES

Stuart L. Watson, Jr., South Charleston, and Gordon R. Humphreys, Clendenin, both of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 469,434, Feb. 24, 1983, Pat. No. 4,487,964. This application Nov. 29, 1984, Ser. No. 676,084

Int. Cl.[4] C08F *8/30;* **C08L** *75/00*

U.S. Cl. 525—123 **10 Claims**

1. A method of preparing a cross-linkable composition comprising admixing:

(a) a carboxylated latex,

(b) a cross-linking catalyst, and

(c) a mixed aliphatic and aromatic polycarbodiimide prepared by a process comprising the following steps seriatim:

(A) charging a mixture of cycloaliphatic or saturated aliphatic mono- and diisocyanates to a reactor with agitation under an inert atmosphere;

(B) heating the resultant mixture to about 120° to about 160° C.;

(C) adding a catalytic amount of a phospholene oxide catalyst to the reactor;

(D) feeding a mixture of a non-reactive solvent and aromatic mono- and/or diisocyanate to the reactor; and

(E) maintaining agitation at about 120° to about 160° C. until all of the isocyanate functionality is converted to carbodiimide functionality, with the provisos that:

(a) said cycloaliphatic moieties contain 6 to about 10 carbons;

(b) said saturated aliphatic moieties contain from about 4 to about 12 carbons;

(c) said aromatic moieties contain from 6 to about 16 carbons;

(d) the molar ratio of all of the mono-to-diisocyanates ranges from about 2:1 to about 2:10; and

(e) the molar ratio of cycloaliphatic and/or saturated aliphatic isocyanate groups to aromatic isocyanate groups ranges from about 0.5:1 to about 2:1.

4,587,302

BUTYL RUBBER AND CHLORINATED RUBBER COMPOSITION

Dominic A. Berta, New Castle County, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Mar. 25, 1985, Ser. No. 715,326

Int. Cl.[4] C08L *9/00, 47/00*

U.S. Cl. 525—237 **6 Claims**

1. A vulcanized rubber composition consisting essentially of:

(a) from about 80% to about 99% of a rubber material selected from the group consisting of butyl rubber, halobutyl rubber having from about 1% to about 3% by weight of halogen, and mixtures thereof; and

(b) from about 1% to about 20% chlorinated hydrocarbon polymer selected from the group consisting of chlorinated polyisoprene having a chlorine content from about 63% to about 66% by weight and chlorinated polyolefins having a chlorine content from about 30% to about 70% by weight.

4,587,303

POLYETHYLENE BLEND AND FILM

Brian L. Turtle, Linlithgow, Scotland, assignor to BP Chemicals Limited, London, England

Filed Apr. 21, 1983, Ser. No. 487,286

Claims priority, application United Kingdom, Apr. 27, 1982, 8212185

Int. Cl.[4] C08L *23/06, 23/18, 23/20*

U.S. Cl. 525—240 7 Claims

1. A self-supporting film fabricated from a blend essentially consisting of

(A) 80 to 95 weight % of ethylene hydrocarbon copolymer (LLDPE) having a density in the range 0.916 to 0.924 and manufactured by a gas-fluidised bed polymerisation process in the presence of a transition metal-containing coodination catalyst and

(B) from 5 to 20 weight % of high pressure polymer which is low density polyethylene or an ethylene copolymer containing not more than 15 moles % of copolymerised comonomer, the high pressure polymer having been manufactured by the high pressure free radical process and having a melt index (ASTM D-1238, condition E, measured at 190° C. in units of grams per 10 minutes) in the range of 7 to 15, said high pressure polymer having a die swell ratio of at least 1.65, and said film having a haze of not more than 6.5%.

4,587,304

SULFOMALEATION OF POLYOLEFINS

Warren A. Thaler, Flemington; Stanley J. Brois, Westfield, and Francis N. Ferrara, Dunellen, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Sep. 20, 1985, Ser. No. 778,269

Int. Cl.[4] C08F *8/34*

U.S. Cl. 525—285 8 Claims

1. A polymer which is a sulfomaleic anhydride adduct or sulfoester maleic anhydride adduct with an unsaturated hydrocarbon polymer.

4,587,305

COMPOSITION FOR USE IN PREPARING NYLON BLOCK COPOLYMER

Albert Y. Garner, Springfield; James D. Gabbert, Wilbraham, both of Mass., and Ross M. Hedrick, St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 560,644, Dec. 12, 1983, abandoned. This application Oct. 9, 1984, Ser. No. 658,958

Int. Cl.[4] C08L *23/26, 67/02, 71/02*

U.S. Cl. 525—331.9 16 Claims

1. A composition for use in fast polymerization of epsilon-caprolactam to form a nylon-6 block copolymer, said composition comprising an acyllactam and magnesium halide formed by the reaction of 2±0.2 equivalents of an acid halide functional material with one mole of a magnesium dilactam, wherein the acid halide functional material is an oligomer or polymer containing at least one acid halide group per molecule.

4,587,306

PREPARATION OF POLYMERS OF HYDROXAMIC FUNCTIONS

Lino Vio, Pau, and Gilles Meunier, Lescar, both of France, assignors to Societe Nationale Elf Aquitaine, Courbevoie, France

Filed Aug. 24, 1983, Ser. No. 526,027

Claims priority, application France, Sep. 28, 1982, 82 16317

Int. Cl.[4] C08F *8/32*

U.S. Cl. 525—354 12 Claims

1. A process for the preparation of a polymer with hydroxamic functions by heating an aqueous solution of polyacrylamide with hydroxylamine salt, which comprises carrying out the reaction at a temperature of from about 50° to 85° C., and wherein the replacement rate of the amido groups by the hydroxamic groups is controlled by using a proportion of hydroxylamine salt of about 0.2 to 1.2 mol per amide group present in the polyacrylamide used.

4,587,307

QUALITY OF ISOBUTENE POLYMERS IN REACTIONS WITH MALEIC ANHYDRIDE

Klaus Bronstert, Carlsberg; Waldhelm Hochstein, Freinsheim; Hans-Henning Vogel, Frankenthal, and Hans P. Rath, Gruenstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 3, 1984, Ser. No. 657,383

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1983, 3336355

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—362 19 Claims

1. A process for improving the processing properties of an isobutene polymer so as to prevent deposits on the walls of a reaction vessel during reaction of said polymer with maleic anhydride, which process comprises:

treating said polymer at a temperature of about 0° to 280° C. by passage thereof, for an effective period of time sufficient to substantially prevent said deposits in the reaction of the polymer with maleic anhydride, over and in contact with at least one of the compounds selected from the group consisting of

(a) aluminum oxide and/or a completely or partially hydrated aluminum oxide;

(b) boron oxide and/or a completely or partially hydrated boron oxide;

(c) titanium oxide and/or a completely or partially hydrated titanium oxide; and

(d) a completely or partially hydrated silicon dioxide, with the proviso that the treatment temperature is at least about 50° up to 280° C. when using only one or more of the aluminum compounds (a).

4,587,308

METHOD FOR PRODUCING IMPROVED WATER-ABSORBENT RESINS

Muneharu Makita, Takatsuki, and Shozo Tanioku, Nara, both of Japan, assignors to Arakawa Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 4, 1985, Ser. No. 697,759

Claims priority, application Japan, Feb. 4, 1984, 59-19064

Int. Cl.[4] C08J *7/12*

U.S. Cl. 525—373 10 Claims

1. A method for producing an improved water-absorbent resin which comprises allowing a water-absorbent resin in the form of particles to absorb a crosslinking agent and water in the presence of a powder of an inert inorganic material, and heating the resulting mixture with agitation, thereby effecting a crosslinking reaction of said resin and removal of water, said resin containing units of a monomer having a carboxyl group in the form of free acid or a salt as a constituent component thereof.

4,587,309

PROCESS FOR PRODUCING POLYETHERESTERAMIDES

Chiaki Tanaka, Tokyo; Makoto Kondou, and Yoshiyuki Yamamoto, both of Nagoya, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Apr. 18, 1985, Ser. No. 724,611

Claims priority, application Japan, Apr. 27, 1984, 59-83690

Int. Cl.[4] C08F *283/00;* C08G *63/76, 69/48;* C08L *67/00*

U.S. Cl. 525—419 7 Claims

1. The processes for producing polyetheresteramides wherein one or more than two polyamide forming components (A) selected from lactams and aminocarboxylic acids as well as the salts of the substantially-equal quantities of diamines and

dicarboxylic acids and (B) the polyetherester forming components consisting of substantially-equal quantities of dicarboxylic acids and poly(alkylene oxide) glycols are subjected to polycondensation while melted, which is characterized in that said polycondensation is carried out in the presence of 0.001 to 0.5 percent by weight per said polyetheresteramides of the mixtures composed of antimony oxides/organic tin compounds at the ratios of 80/20 to 30/70 by weight.

4,587,310

CARBONATE POLYMES CONTAINING A POLYETHER POLYOL METAL SALT COMPLEX

Samual A. Ogoe, Angleton, and Kevin F. Dick, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 3, 1985, Ser. No. 740,666
Int. Cl.[4] C08F *283/02*
U.S. Cl. 525—462 20 Claims

1. A transparent ignition resistant polymeric composition which comprises

(A) a carbonate polymer, and

(B) a polyether polyol metal salt complex in an amount effective to give a significant increase in ignition resistance

wherein said metal salt comprises a halogen containing anion, and a metal cation wherein the metal is an alkali or alkaline earth metal and wherein said polyol has a molecular weight greater than 800.

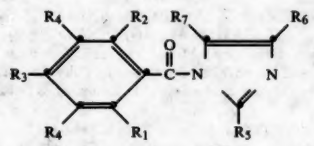
4,587,311

NOVEL IMIDAZOLIDES AND THEIR USE AS CURING AGENTS FOR POLYEPOXIDE COMPOUNDS

Rolf Schmid, Schwarzenburg; Helmut Zondler, Bottmingen; Michael Fischer, Tafers, and Werner Stauffer, Fribourg, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 20, 1984, Ser. No. 602,260
Claims priority, application Switzerland, Apr. 29, 1983, 2316183
Int. Cl.[4] C08G *59/54, 59/44*
U.S. Cl. 525—504 6 Claims

1. A curable mixture comprising at least one imidazolide of the formula I



(I)

wherein

R_1 is methyl, ethyl or isopropyl,

R_2, R_3 and R_4 independently of one another are each hydrogen, methyl, ethyl or isopropyl, with the proviso that R_2 is hydrogen only when R_1 is isopropyl,

R_5, R_6 and R_7 independently of one another are each hydrogen, methyl, ethyl or isopropyl, or phenyl which is unsubstituted or substituted by methyl or ethyl groups, with the proviso that at least one of the symbols R_5, R_6 and R_7 is phenyl which is unsubstituted or substituted according to definition, and a polyepoxide compound having an average more than one epoxy group in the molecule.

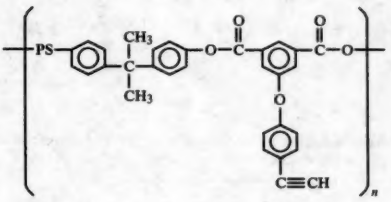
4,587,312

SULFONE-ESTER POLYMERS CONTAINING PENDENT ETHYNYL GROUPS

Paul M. Hergenrother, Yorktown, and Brian J. Jensen, Newport News, both of Va., assignors to The United States of America as represented by the National Aeronautics and Space Administration, Washington, D.C.

Filed May 23, 1984, Ser. No. 613,139
Int. Cl.[4] C08G *63/66, 75/23*
U.S. Cl. 525—535 11 Claims

1. The class of ethynyl containing sulfone-esters having the general formula



where

PS is an polyarylene ether sulfone with an number average molecular weight of less than 50,000 g/mole, and

n is an integer of 1 or greater.

4,587,313

RADIATION CURABLE PRESSURE-SENSITIVE ADHESIVE COMPOSITION

Tomohisa Ohta; Akihiko Dobashi, both of Shimodate, and Yasuyuki Seki, Hitachi, all of Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed Nov. 20, 1984, Ser. No. 673,411
Int. Cl.[4] C08F *2/00, 122/10;* C08L *33/04;* C09J *3/14*
U.S. Cl. 526—75 5 Claims

1. A radiation curable pressure-sensitive adhesive composition which comprises 100 parts by weight of a liquid oilgomer having one or more acrylic unsaturated double bonds in its molecule, 0.2 to 20 parts by weight of a thiol compound and 0.5 to 30 parts by weight of at least one acrylic monomer having an acidic group selected from the group consisting of acrylic acid, methacrylic acid, acryloyloxyethyl hydrogenphthalate, 2-acrylamide-2-methylpropane-sulfonic acid, 3-chloro-2-acidophosphoxypropyl methacrylate, 2-acidophos-phoxyethyl acrylate, 2-acidophosphoxypropyl methacrylate, di(2-methacryloyloxyethyl) phosphate, and di(2-acryloyloxyethyl) phosphate.

4,587,314

CONTINUOUS POLYMERIZATION REACTOR

Mason S. Wilt, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 285,644, Jul. 21, 1981, Pat. No. 4,438,074. This application Mar. 7, 1984, Ser. No. 586,950
Int. Cl.[4] C08F *2/00*
U.S. Cl. 526—88 1 Claim

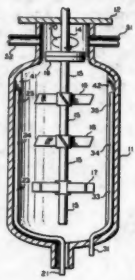
1. A method for contacting olefinic monomer and initiator in a continuous polymerization process comprising the steps of:

creating three turbulent zones in a vessel;

introducing said olefinic monomer into a first part of the periphery of each one of said three turbulent zones;

introducing said initiator into a second part of the periphery of each one of said three turbulent zones, wherein said first

part of said periphery of each one of said three turbulent zones is substantially diametrically opposed to said second



part of said periphery of each one of said three turbulent zones respectively.

4,587,315

DIETHYNYLATED PHENYLBENZIMIDAZOLE COMPOUNDS

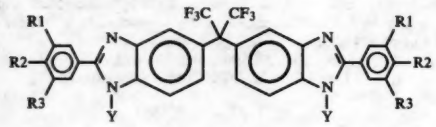
Kreisler S. Y. Lau, Alhambra, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 655,009, Sep. 26, 1984, Pat. No. 4,537,974. This application May 20, 1985, Ser. No. 735,926

Int. Cl.[4] C08F *14/18*

U.S. Cl. 526—247 **3 Claims**

1. A polymer composition consisting essentially of polymerized monomers having the formula:



where Y is phenyl, cyclohexyl, adamantyl or phenoxylated-phenyl of the formula $C_6H_5(OC_6H_4)n$ (n=1 to 3) and where R1, R2 and R3 are ethynyl, phenoxyethynyl, phenylethynyl or hydrogen, and further wherein at least one of said R1, R2 or R3 is not hydrogen.

4,587,316

FLUORINE-CONTAINING COPOLYMERS AND FILMS THEREOF

Shinichi Nakagawa, Nara; Tsuneo Nakagawa, Osaka; Toshihiko Amano, Osaka; Mitsugu Omori, Osaka; Sadaatsu Yamaguchi, Osaka, and Kozo Asano, Osaka, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Jan. 31, 1984, Ser. No. 575,673

Claims priority, application Japan, Feb. 1, 1983, 58-15592

Int. Cl.[4] C08F *214/26, 214/28*

U.S. Cl. 526—247 **5 Claims**

1. A film of a fluorine-containing copolymer comprising monomeric units of:

(a) 8 to 15% by weight of hexafluoropropene on the basis of the weight of the copolymer,

(b) 0.2 to 2% by weight of a fluoroalkyl vinyl ether of the formula:

$$CF_2{=}CF{-}O{-}(CF_2)n{-}CF_2X$$

wherein X is hydrogen or fluorine, and n is an integer of 3 to 9, on the basis of the weight of the copolymer, and

(c) the balance of the copolymer comprising tetrafluoroethylene, said copolymer having a specific melt viscosity of at least 0.5×10^4 poise, said film derived therefrom having a good flex resistance of at least 3,000 cycles of bending without being broken when subjected to a MIT flex resistance test.

4,587,317

CROSSLINKED POLYMERS OBTAINABLE BY CATIONIC POLYMERIZATION AND FORMED FROM UNSATURATED BICYCLIC IMIDES

Alfred Renner, Muntelier, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 31, 1985, Ser. No. 696,630

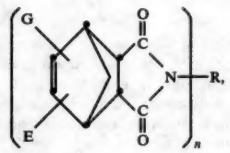
Claims priority, application Switzerland, Jan. 31, 1984, 449/84

The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.

Int. Cl.[4] C08F *26/06*

U.S. Cl. 526—259 **18 Claims**

1. A crosslinked polymer which can be obtained by heating an imide of the formula I



(I)

in which E is allyl or methallyl, G is hydrogen or methyl and n is 1 or 2, and, if n is 1, R is hydrogen, alkyl having 1–12 C atoms, alkenyl having 3–6 C atoms, cycloalkyl having 5–8 C atoms, aryl having 6–10 C atoms or benzyl, or, if n is 2, R is $-C_mH_{2m}-$ in which m=2–20, arylene having 6–10 C atoms or a group of the formula II

(II)

in which T is methylene, isopropylidene, CO, O, S or SO_2, in the presence of at least one catalyst suitable for cationic polymerization.

4,587,318

ETHYLENE COPOLYMER COMPOSITIONS FOR ROTATIONAL MOLDING

Takashi Inoue, Yokohama; Mituji Miyoshi, Fujisawa; Kazuo Matsuura, and Kaoru Yamamoto, both of Tokyo, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan

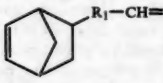
Filed Jan. 24, 1985, Ser. No. 694,647

Claims priority, application Japan, Jan. 27, 1984, 59-12120

Int. Cl.[4] C08F *8/00*

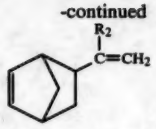
U.S. Cl. 526—282 **6 Claims**

1. An ethylene copolymer composition for rotational molding, comprising a copolymer of ethylene, 0–3 mole % of an α-olefin and 0.02 to 1% of a non-conjugated diene represented by the following formula (I) or (II) or a derivative thereof:



(I)

-continued



(II)

wherein R_1 is an alkylene group having one or two carbon atoms and R_2 is hydrogen or an alkyl group having one or two carbon atoms, and an organic peroxide, said copolymer having a melt index of 2 to 50 g/10 min, a density of 0.930 to 0.970 g/cm^3 and a maximum peak temperature (Tm) measured according to Differential Scanning Calorimetry (DSC) of not lower than 100° C.

4,587,319

SALIFIED ACRYLIC ALLYLOLIGOSACCHARIDE COPOLYMER, A PROCESS FOR PREPARING THE COPOLYMER, AND APPLICATION AS A SUPER-ABSORBENT

Herve Tournier, Valleiry, France, assignor to Beghin-Say S.A., Thumeries, France

PCT No. PCT/FR84/00066, § 371 Date Nov. 19, 1984, § 102(e) Date Nov. 19, 1984, PCT Pub. No. WO84/03706, PCT Pub. Date Sep. 27, 1984

PCT Filed Mar. 16, 1984, Ser. No. 682,351

Claims priority, application France, Mar. 18, 1983, 83 04488

Int. Cl.[4] A61L *15/00;* **C08F** *216/12, 220/04*

U.S. Cl. 527—313 **21 Claims**

1. A salified acrylic allyloligosaccharide copolymer characterized in that it consists in a chemically combined form of at least one allyloligosaccharide with a mean degree of substitution less than 4 per oligosaccharide molecule and of at least one acrylic derivative with partly or totally salified carboxyl functions, said copolymer, following 30 minutes in water with a salt content of 10 g/liter, evincing a degree of retention in excess of 8 g of saline water per gram of copolymer.

4,587,320

METHOD FOR MAKING CARBOXYFUNCTIONAL SILICONE GLYCOLS

Terence J. Swihart, Essexville, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 21, 1984, Ser. No. 684,995

Int. Cl.[4] C08G *77/04*

U.S. Cl. 528—23 **19 Claims**

1. A method for making a carboxyfunctional silicone glycol which method comprises the steps of:

(1) mixing together

(a) a silicone glycol or a mixture of silicone glycols in which at least one of the glycol radicals is bonded to silicon with an Si—C linkage;

(b) a carboxyfunctional siloxane, or a mixture of carboxyfunctional siloxanes in which at least one of the carboxy radicals is bonded to silicon with an Si—C linkage wherein at least one of (a) and (b) also includes non-glycol-containing and non-carboxyfunctional-containing diorganosiloxane units; and

(c) a catalytic amount of an acid catalyst capable of breaking Si—O linkages in (a) and (b) but incapable of breaking Si—C linkaqes therein;

(2) heating the mixture to an elevated temperature; and

(3) maintaining the mixture at said elevated temperature for at least about 4 hours, whereby equilibration of (a) and (b) occurs to produce an equilibration product containing carboxyfunctional silicone glycol.

4,587,321

POLYQUATERNARY POLYSILOXANE POLYMERS

Henri Sebag, and Alexandre Zysman, both of Paris, France, assignors to L'Oreal, Paris, France

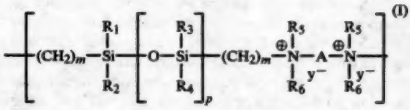
Division of Ser. No. 550,418, Nov. 7, 1983, Pat. No. 4,533,714. This application Apr. 1, 1985, Ser. No. 718,428

Claims priority, application Luxembourg, Nov. 10, 1982, 84463

Int. Cl.[4] C08G *77/04*

U.S. Cl. 528—27 **22 Claims**

1. A composition for treating the hair, nails or skin comprising in a diluent or carrier suitable for application to said hair, nails or skin an effective amount of at least one polyquaternary polysiloxane polymer having recurring units of the formula:



(I)

wherein

A represents a divalent α,ω-bis-(alkyl)-polysiloxane group or a linear or branched, saturated or unsaturated hydrocarbon chain containing up to 6 consecutive carbon atoms, optionally substituted by one or more hydroxyl groups and optionally substituted by one or more chain oxygen atoms and/or aromatic rings;

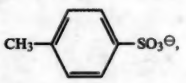
R_1, R_2, R_3 and R_4 each independently represent a C_1–C_6 alkyl radical or a phenyl radical;

R_5 represents methyl, ethyl or hydroxyethyl;

R_6 represents a C_1–C_{18} alkyl radical or two adjacent R_6 radicals together with the nitrogen atom to which they are attached and the A radical therebetween form a divalent piperazino radical;

or two adjacent R_5 radicals together with the two adjacent R_6 radicals attached to the same nitrogen atoms, the said nitrogen atoms and the A radical therebetween form a triethylenediamino radical, or R_5 and R_6 together represent a heterocycle with the nitrogen atom to which they are attached;

Y^- represents $Cl^\ominus$, $Br^\ominus$, $CH_3SO_3^\ominus$ *or*



m represents an integer from 1 to 6; and

p represents a number from 1 to 50.

4,587,322

PROCESS FOR THE PRODUCTION OF URETHANE-MODIFIED POLYISOCYANATE COMPOSITIONS USING A HYDANTOIN HAVING TWO HYDROXYL ALKYL SUBSTITUENTS

Werner Rasshofer, Cologne, and Reiner Paul, Muelheim am Rhein, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 4, 1985, Ser. No. 698,005

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1984, 3405939

Int. Cl.[4] C08G *18/38*

U.S. Cl. 528—60 **8 Claims**

1. A process for the production of urethane-modified polyisocyanate compositions having an isocyanate content of from 5 to 45 wt % comprising reacting

(a) an organic polyisocyanate or a mixture of organic polyisocyanates having an isocyanate content of from 30 to 50 wt % with

(b) at least one hydantoin having an OH number of from 56

to 596 containing two alcoholic hydroxyl groups which hydantoin has hydroxyalkyl substituents on its nitrogen atoms

in quantities such that an NCO:OH equivalent ratio of 2:1 to 50:1 is achieved.

4,587,323

POLYESTER RESIN GELKOTE COMPOSITION

Perry A. Toman, Medina, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Apr. 29, 1985, Ser. No. 728,398
Int. Cl.[4] C08G *18/62*
U.S. Cl. 528—66 **8 Claims**

1. A coating composition suitable for preparing gel coat composites which comprises a hydroxy functional urethane-extended unsaturated polyester free of isocyanate functionality and having a free hydroxyl to urethane mole ratio of from about 0.5 to 6; wherein said urethane extended polyester is the reaction product of a non-aromatic hydroxylated unsaturated polyester, having a number averge molecular weight of from about 500 to 2000 derived by condensation polymerization of fumaric acid or a fumaric acid precursor with one or more non-aromatic glycol, one or more non-aromatic dicarboxylic acids, optionally one or more non-aromatic monocarboxylic acids, with a non-aromatic diisocyanate, polyisocyanate, or isocyanate functional prepolymer.

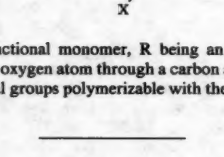
4,587,324

POLYMER OF PHOSPHONYLMETHYL-2,4-AND -2,6-DIAMINO BENZENE AND POLYFUNCTIONAL MONOMER

John A. Mikroyannidis, Patras, Greece, and Demetrius A. Kourtides, Gilroy, Calif., assignors to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 522,629, Aug. 12, 1983, abandoned. This application Aug. 16, 1984, Ser. No. 641,142
Int. Cl.[4] C08G *59/06, 59/18*
U.S. Cl. 528—108 **11 Claims**

1. A method of producing a phosphorus-containing polymer which comprises polymerizing a compound of the formula:



with a polyfunctional monomer, R being an organic group attached to the oxygen atom through a carbon atom and X and Y are functional groups polymerizable with the polyfunctional monomer.

4,587,325

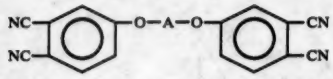
PROCESSABLE AND STABLE CONDUCTIVE POLYMERS FROM DIETHER-LINKED BISORTHODINITRILE MONOMERS

Teddy M. Keller, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 9, 1985, Ser. No. 690,015
Int. Cl.[4] C08G *83/00*
U.S. Cl. 528—172 **15 Claims**

1. A process for producing conductive polymers from diether-linked bisorthonitrile monomers, comprising the steps of:

mixing said monomer having the formula;



wherein A is selected from the group consisting of phenyl radicals, polyphenyl radicals, and fused aromatic polyring radicals, with an amine;

heating said monomer and amine mixture in an oxygen containing atmosphere to a polymerization temperature above said monomers melting point but below the resulting polymers thermal-oxidative decomposition temperature;

heating said polymer to an elevated temperature between 400°-900° C. in an inert atmosphere thereby eliminating oxidative degradation; and

controlling said elevated temperature to yield a conductive, thermally stable, and oxidative resistant polymer with a conductivity that is a function of the elevated temperature.

4,587,326

POLYCARBONATE FROM NONAROMATIC CYCLIC ANHYDRIDE HAVING IMPROVED OPTICAL PROPERTIES

Niles R. Rosenquist, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

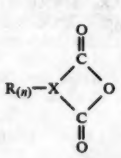
Filed Feb. 11, 1985, Ser. No. 700,097
Int. Cl.[4] C08G *63/62, 63/64*
U.S. Cl. 528—176 **22 Claims**

1. Solvent cast polycarbonate film exhibiting improved haze containing a polycarbonate resin consisting essentially of the polymeric reaction product of:

(i) at least one dihydric phenol;

(ii) a carbonate precursor; and

(iii) an amount effective to improve the haze of said film but insufficient for said polycarbonate to lose some of its advantageous properties, said amount being from about 1 to about 10 mole percent based on the total amounts of said dihydric phenol and cyclic anhydride employed, of at least one cyclic anhydride represented by the general formula



wherein

X is selected from cycloalkylene or cycloalkenylene radicals having the two carbonyl groups bonded directly to adjacent ring carbon atoms,

R is independently selected from lower alkyl radicals, and

n has a value of from 0 up to the number of replaceable hydrogen atoms present on X.

4,587,327

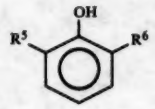
METHOD FOR PREPARING POLYPHENYLENE OXIDE WITH COPPER (I) COMPLEX CATALYSTS

Deborah A. Haitko, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 20, 1984, Ser. No. 652,532
Int. Cl.[4] C08G *65/44*
U.S. Cl. 528—215 **12 Claims**

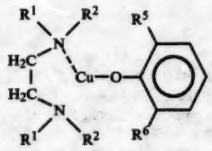
1. A method for preparing polyphenylene oxide which com-

prises oxidatively coupling monohydroxy aromatic compounds of the formula

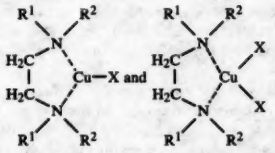


I

in the presence of a catalytic amount of a copper(I)-diamine-phenoxide complex of the formula



said complex being generated within the polymerization medium by reacting a monohydroxy compound of formula I with an alkali metal hydroxide and a complex selected from the group consisting of copper-diamine-halides of the formulas



wherein R^1 is hydrogen or an alkyl radical; R^2 is an alkyl radical, subject to the provisos that (1) R^1 and R^2 taken together contain 4–6 carbon atoms and (2) when R^1 is hydrogen, R^2 is tertiary alkyl; X is halogen; R^5 is selected from the group consisting of hydrogen and primary alkyl radicals of from 1 to 7 carbon atoms and R^6 is selected from the group consisting of hydrogen, primary alkyl radicals of from 1 to 7 carbon atoms and secondary alkyl radicals of from 1 to 7 carbon atoms.

4,587,328

FIRE RETARDANT WATER REPELLENT IMPREGNATING RESINS

Newton N. Goldberg, Penn Hills Twp., Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 21, 1985, Ser. No. 714,610

Int. Cl.[4] C08G *63/68*

U.S. Cl. 528—299 **7 Claims**

1. A heat curable polyester type impregnant composition comprising the reaction product of:

(A) carboxylic acid component, and

(B) hydroxyl component containing both fluorinated aliphatic monohydric alcohol and non-fluorinated polyol, where the fluorinated aliphatic monohydric alcohol has the structural formula $F(CF_2)_n—(CH_2)_m—OH$, where n is an integer from 4 to 12 and m is an integer from about 2 to about 12, and constitutes from 1 wt.% to 40 wt.% of the total fluorinated alcohol plus non-fluorinated polyol content of the impregnating composition, said composition being characterized as being water repellent and flame retardant upon cure.

4,587,329

DENSE STAR POLYMERS HAVING TWO DIMENSIONAL MOLECULAR DIAMETER PER EXR

Donald A. Tomalia, Midland, and James R. Dewald, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 641,807, Aug. 17, 1984, which is a continuation-in-part of Ser. No. 456,226, Jan. 1, 1983, Pat. No. 4,507,466, which is a continuation-in-part of Ser. No. 565,686, Dec. 27, 1983. This application Jul. 19, 1985, Ser. No. 757,546

Int. Cl.[4] C08G *69/00*

U.S. Cl. 528—363 **17 Claims**

1. A dense star polymer having at least one core branch emanating from a core, each core branch having at least one terminal group provided that (1) the ratio of terminal groups to the branches emanating from the core is 2:1 or greater, (2) the density of terminal groups in the dense star polymer is at least 1.5 times that of an extended conventional star polymer having similar core and monomeric moieties and a comparable molecular weight and number of core branches wherein each of such branches of the extended conventional star polymer bears only one terminal group, (3) a molecular volume that is equal to or less than 80 percent of the molecular volume of said extended conventional star polymer, and (4) the two-dimensional molecular diameter of the dense star polymer is in the range from about 12 to about 2000 Angstroms.

4,587,330

PURIFICATION OF POLYMER SOLUTIONS

David R. Warfel, Exton, and Harold L. Nicholson, West Chester, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 22, 1985, Ser. No. 704,237

Int. Cl.[4] C08F *6/12*

U.S. Cl. 528—490 **15 Claims**

1. A method of purifying a polymer prepared by anionic polymerization in an organic diluent in the presence of a lithium initiator, comprising

(a) contacting the polymer solution resulting from the polymerization with boric acid, in an amount of at least about 3 wt. % based on polymer weight, to form a liquid phase and a solid phase;

(b) separating the solid phase from the liquid phase, and

(c) isolating the polymer from the liquid phase.

4,587,331

PLATINUM COMPLEXES OF POLYHYDROXYLATED ALKYLAMINES AND 2-POLYHYDROXYLATED ALKYL-1,2-DIAMINOETHANES

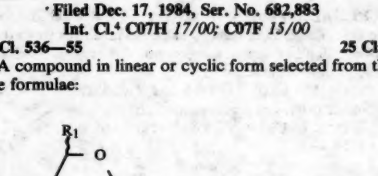
Joseph J. Hlavka, Tuxedo; Ralph G. Child, Pearl River; Panayota Bitha, Pomona, and Yang I. Lin, Nanuet, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 17, 1984, Ser. No. 682,883

Int. Cl.[4] C07H *17/00*; C07F *15/00*

U.S. Cl. 536—55 **25 Claims**

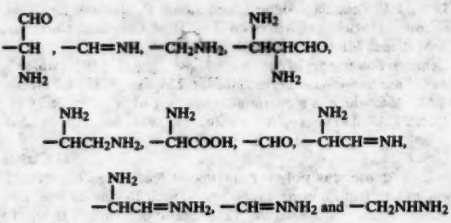
1. A compound in linear or cyclic form selected from those of the formulae:



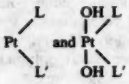
(1) (2)

wherein in cyclic form (1) R_1 is selected from the group consisting of hydrogen, alkyl (C_1–C_3), hydroxymethyl and aminomethyl; and R_2, R_3 and R_4 are each individually selected from the group consisting of hydroxy and amino with the proviso that at least one of R_2, R_3 and R_4 must be hydroxy; and

wherein in linear form (2) R_5 is selected from the group consisting of



and n is an integer 2–4 and R_6 is selected from the group consisting of methyl, hydroxymethyl and aminomethyl; and wherein in both cyclic (1) and linear form (2), A is selected from the group consisting of



wherein L and L' are the same or different and are each selected from the group consisting of halide, nitrate and sulfate and L and L' taken together is selected from the group consisting of oxalic, malonic, methylmalonic, succinic, tartronic and 1,1-cyclobutanedicarboxylic acids.

4,587,332

MODIFIED WHEAT "B" STARCH FOR CORRUGATING ADHESIVES

Christopher C. Lane, Kirkland; Alexander B. Anonychuk, Brossard, and Peter Unger, St. Lambert, all of Canada, assignors to Ogilvie Mills Ltd., Montreal, Canada

Continuation-in-part of Ser. No. 584,346, Feb. 28, 1984, abandoned. This application Feb. 12, 1985, Ser. No. 700,868

Int. Cl.[4] C08B *31/00*; C09J *3/06*; C08L *3/02*

U.S. Cl. 536—102 **55 Claims**

1. A modified wheat "B" starch wherein aqueous dispersions of said modified wheat "B" starch have reduced viscosities relative to comparable aqueous dispersions of a corresponding unmodified wheat "B" starch, said reduced viscosities not being less than about 12 centipoise grams per cubic centimeter for a precooked 15/1 water to modified starch dispersion at between 33° C. to 36° C.

4,587,333

CEPHALOSPORINS AND THEIR PRODUCTION

Hideo Ono, Kobe; Yukimasa Nozaki, Ikeda, and Setsuo Harada, Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

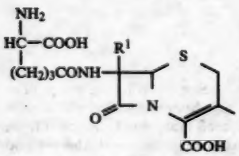
Filed Sep. 14, 1984, Ser. No. 651,037

Claims priority, application Japan, Sep. 20, 1983, 58-174897

Int. Cl.[4] C07D *501/08, 501/28*; A61K *31/545*

U.S. Cl. 544—21 **8 Claims**

1. A compound of the formula:



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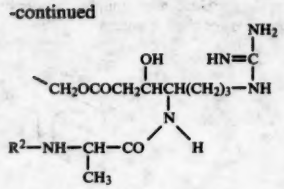


wherein R^1 stands for hydrogen or formylamino, R^2 stands for hydrogen, alanyl or alanyl-alanyl, or its salt.

4,587,334

PROCESS FOR MAKING CYANURIC ACID

Werner Pieper, Kerpen, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 28, 1985, Ser. No. 695,265

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1984, 3404873

Int. Cl.[4] C07D *251/32*

U.S. Cl. 544—192 **2 Claims**

1. In the process for making cyanuric acid by heating urea with previously produced cyanuric acid, which comprises:

(a) using as starting material granulated cyanuric acid having the particle size targeted for the final product;

(b) making the said cyanuric acid, urea and water in a ratio by weight of 1.5–3:1:0.04–0.08 into a preliminary mixture, and

(c) allowing the said mixture to stand over a period of 10 to 20 hours; thereafter heating said mixture with continuous agitation to temperature of 270° to 340° C. over as long a period as necessary to effect the condensation of the urea to cyanuric acid, with the resultant formation of granulated cyanuric acid.

4,587,335

PROCESS FOR PREPARING 4-HYDROXY-2-METHYL-2H-1,2-BENZOTHIAZINE-3-[(N-(2-PYRIDINYL)CARBOXAMIDE)]-1,1-DIOXIDE, PHOSPHORIC ESTER

Vincenzo Iannella, Viale Bianca Maria 20, Milan, Italy

Division of Ser. No. 385,175, Jun. 4, 1982, Pat. No. 4,474,955. This application Jul. 17, 1984, Ser. No. 631,616

Claims priority, application Italy, Jun. 17, 1981, 22364 A/81; Aug. 7, 1981, 23432 A/81

Int. Cl.[4] C07D *279/02*

U.S. Cl. 544—49 **1 Claim**

1. A process for preparing 4-phosphonooxy-N-(2-pyridyl)-2H-1,2-benzothiazine-3-carboxamide-1,1-dioxide (XIII) comprising reacting phosphorous oxychloride, 4-hydroxy-N(2-pyridyl)-2H-1,2-benzothiazine-3-carboxamide-1,1-dioxide (VII) in pyridine and water.

4,587,336

PARTIALLY HYDROGENATED INTERMEDIATE PYRAZOLO, PYRIMIDO AND THIAZOLO[1,4]BENZOXAZINES

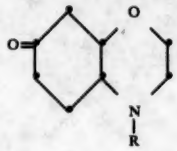
Richard N. Booher, and Edmund C. Kornfeld, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 640,897, Aug. 15, 1984, Pat. No. 4,522,956. This application Aug. 5, 1985, Ser. No. 762,182

Int. Cl.[4] C07D *265/28*

U.S. Cl. 544—105 **19 Claims**

1. A trans-(±) racemate of the formula



wherein R is methyl, ethyl or n-propyl.

4,587,337

PROCESS FOR THE PREPARATION OF 2-AMINO-S-TRIAZINES

Stefan Weiss, and Helmut Krommer, both of Trostberg, Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Fed. Rep. of Germany

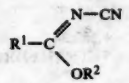
Filed Mar. 25, 1985, Ser. No. 715,114

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1984, 3411202; Mar. 27, 1984, 3411203

Int. Cl.[4] C07D *251/16, 251/18, 251/42*

U.S. Cl. 544—194 **28 Claims**

1. A process for the preparation of a 2-amino-s-triazine in high yield and high purity comprising the steps of mixing together in an aqueous, alcoholic or aqueous-alcoholic reaction medium approximately stoichiometric amounts of reaction components comprising (a) an N-cyanimido ester having the formula:



in which R1 is selected from the group consisting of hydrogen, akyl having from 1 to 24 carbon atoms, aralkyl and aryl, and R2 is an alkyl group having 1 to 4 carbon atoms; (b) a salt compound selected from the group consisting of salts of O-alkyl isoureas, s-alkyl isothioureas, guanidines and amidines, and (c) a base selected from the group consisting of sodium methylate, sodium carbonate, potassium carbonate and alkali metal hydroxides, reacting said reaction components at a temperature of between −10° C. and 50° C. for a sufficient period of time to form a reaction product comprising said 2-amino-s-triazine, and washing and drying said reaction product to form said 2-amino-s-triazine in high yield and high purity.

4,587,338

PERFLUOROALKYL ESTERS OF ANTHRANILIC ACIDS

Erich Schinzel, Hofheim am Taunus, and Manfred Pelster, Speyer, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

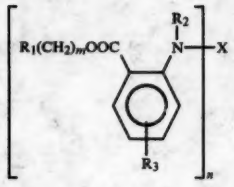
Filed Sep. 13, 1984, Ser. No. 650,357

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1983, 3333457

Int. Cl.[4] C07D *251/42, 251/50, 251/70, 251/44*

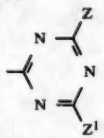
U.S. Cl. 544—197 **5 Claims**

1. A perfluoroalkyl ester of an anthranilic acid, of the formula (1)

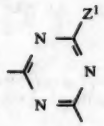


(1)

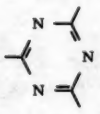
in which R_1 is perfluoroalkyl or perfluoroalkoxy-perfluoroalkyl, in each case having a total of 2–20 carbon atoms, R_2 is hydrogen, straight-chain or branched C_1–C_4-alkyl or phenyl, R_3 is one or more radicals selected from fluorine, chlorine, bromine, lower alkyl, lower alkoxy, carboxyl, C_1–C_4-alkanoylamino, cyano, carboxylic acid ester, carboxamide, monoalkylcarboxamide, dialkylcarboxamide, sulfo, sulfonic acid ester, sulfonamide, monoalkylsulfonamide, dialkylsulfonamide, or phenyl, m is an integer from 1 to 6, n is an integer from 1 to 3, and X, if n=1, is a group of the formula



or, if n=2, is a group of the formula



or, if n=3, is a group of the formula



wherein, Z is chlorine, hydroxyethylamino or bis-hydroxyethylamino, and Z^1 is chlorine, hydroxyethylamino, bis-hydroxyethylamino, dialkylaminoalkylamino, trialkylammoniumalkylamino, sulfoethylamino, N-alkyl-N-sulfoethylamino, piperazinyl, N-hydroxyethylpiperazinyl, N-methyl-N-hydroxyethylpiperazinyl, phenylamino, sulfophenylamino, disulfophenylamino, alkylphenylamino or sulfatoethylsulfonylphenylamino.

4,587,339

NICKEL COMPLEX PIGMENTS OF BIS-AZOMETHINES

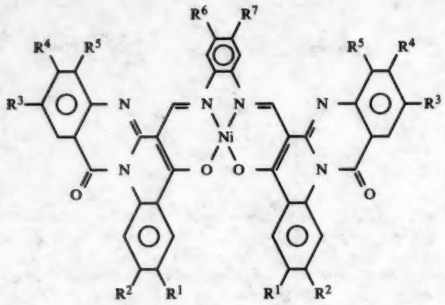
Terence R. Chamberlain, Cincinnati, Ohio, assignor to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 542,019, Oct. 14, 1983, Pat. No. 4,508,899. This application Nov. 19, 1984, Ser. No. 673,119

Int. Cl.[4] C07D *519/00;* C09B *170/00*

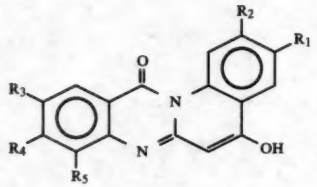
U.S. Cl. 544—225 **6 Claims**

1. A process for the production of nickel complexes having the structural formula

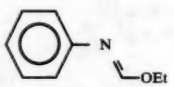


wherein each R^1, each R^3, and R^7 represent hydrogen, halogen, nitro, or lower alkyl and each R^2, each R^4, each R^5, and R^6 represent hydrogen or halogen, that comprises the steps of

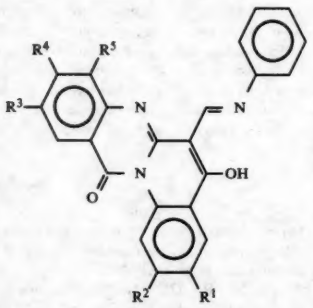
(a) heating an N-(2-carboxyphenyl)-2-methyl-4-quinazolone with N-methylpyrrolidone and acetic anhydride to form a 3-hydroxy-8-oxoquinazolo-[3,2-a]-quinoline having the structural formula



(b) heating the product of step (a) with ethyl N-phenylformimidate having the structural formula

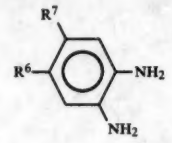


in the presence of an acid catalyst to form a phenyl azomethine having the structural formula



and

(c) reacting said phenyl azomethine with a diaminobenzene having the structural formula



and a water-soluble nickel (II) salt in an inert solvent to form the nickel complex.

4,587,340

BIOPTERIN ANALOGS

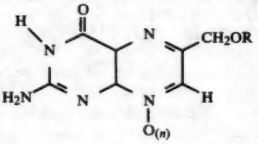
Charles A. Nichol; John F. Reinhard, Jr., both of Durham; Gary K. Smith, Raleigh, and Eric C. Bigham, Chapel Hill, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation-in-part of Ser. No. 533,786, Sep. 19, 1983, abandoned. This application Jun. 13, 1984, Ser. No. 620,152

Int. Cl.[4] **C07D** *475/04;* **A61K** *31/505*

U.S. Cl. 544—258 **3 Claims**

1. The compound of the formula (IIA)



(IIA)

where n is 1 and R represents a lower alkyl of 1 to 8 carbons or a salt thereof.

4,587,341

2,4-DIAMINO-5-(1,2,3,4-TETRAHYDRO-(SUBSTITUTED OR UNSUBSTITUTED)-6-QUINOLYLMETHYL)PYRIMIDINES, USEFUL AS ANTIMICROBIALS

Barbara Roth, Chapel Hill, and Barbara S. Rauckman, Durham, both of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Apr. 29, 1983, Ser. No. 490,198

Claims priority, application United Kingdom, May 7, 1982, 8213249

Int. Cl.[4] **C07D** *239/49, 401/06, 405/06;* **A61K** *31/505*

U.S. Cl. 544—324 **3 Claims**

1. A compound which is selected from 2,4-diamino-5-(1,2,3,4-tetrahydro-6-quinolylmethyl)pyrimidine, 2,4-diamino-5-(1,2,3,4-tetrahydro-8-(2-methoxyethoxy)-6-quinolylmethyl)-pyrimidine, and 2,4-diamino-5-(1,2,3,4-tetrahydro-4-methyl-6-quinolylmethyl)pyrimidine or a pharmaceutically acceptable salt thereof.

4,587,342

2,4-DIAMINO-(SUBSTITUTED-BENZOPYRAN(-QUINOLYL,ISOQUINOLY)METHYL)PYRIMIDINES USEFUL AS ANTIBACTERIALS

Susan M. Daluge, 297 Azalea Dr., Chapel Hill, N.C. 27514, and Paul M. Skonezny, 1513 Cotherstone Dr., Durham, N.C. 27712

Division of Ser. No. 319,647, Nov. 8, 1981. This application Oct. 31, 1983, Ser. No. 546,850

Claims priority, application United Kingdom, Nov. 11, 1980, 8036135

Int. Cl.[4] **C07D** *419/06;* **A61K** *31/505*

U.S. Cl. 544—324 **27 Claims**

1. A compound which is selected from

2,4-diamino-5-(7,8-dimethoxy-2H-1-benzopyran-5-ylmethyl)pyrimidine,
2,4-diamino-5-(3,4-dihydro-7,8-dimethoxy-2H-1-benzopyran-5-ylmethyl)-pyrimidine,
2,4-diamino-5-(8-methoxy-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(7,8-dimethoxy-2-methyl-2H-1-benzopyran-5-ylmethyl)-pyrimidine,
2,4-diamino-5-(7,8-dimethoxy,-2,2-dimethyl-2H-1-benzopyran-5-ylmethyl)pyrimidine,
2,4-diamino-5-(8-amino-7-methyl-5-quinolymethyl)pyrimidine,
2,4-diamino-5-(7,8-dimethoxy-2-oxo-2H-1-benzopyran-5-ylmethyl)-pyrimidine,
2,4-diamino-5-(7,8-dimethoxy-2-methyl-4H-1-benzopyran-5-ylmethyl)pyrimidine,
5-(7-allyl-8-hydroxy-2-methyl-5-quinolylmethyl)-2,4-diaminopyrimidine,
5-(7-allyl-8-hydroxy-5-quinolylmethyl)-2,4-diaminopyrimidine,
5-(7-allyl-8-methoxy-5-quinolylmethyl)-2,4-diaminopyrimidine,
2,4-diamino-5-(8-methoxy-7-(1-propenyl)-5-quinolylmethyl)pyrimidine,
5-(7-allyl-8-methoxy-2-methyl-5-quinolymethyl)2,4-diaminopyrimidine,
2,4-diamino-5-(8-amino-7-methoxy-5-quinolylmethyl)-pyrimidine,
2,4-diamino-5-(8-dimethylamino-7-methoxy-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(8-1-pyrrolyl-7-methyl-5-quinolylmethyl)-pyrimidine,
2,4-diamino-5-(8-dimethylamino-7-methyl-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(8-methoxy-7-propylquinolylmethyl)pyrimidine,
2,4-diamino-5-(8-hydroxy-7-methoxy-5-quinolylmethyl)-pyrimidine,
2,4-diamino-5-(7,8-dimethoxy-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(7-methyl-5-quinolylmethyl)pyrimidine,
4-amino-5-(7,8-dimethoxy-2H-1-benzopyran-5-ylmethyl)-2-glycinamidopyrimidine,
2,4-diamino-5-(8-amino-7-ethoxy-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(8-amino-7-methylthio-5-quinolylmethyl)-pyrimidine,
2,4-diamino-5-(8-amino-7-chloro-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(7-methoxy-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(7-methoxy-8-methylthio-5-quinolylmethyl)-pyrimidine,
5-(7-allyl-8-(2-methoxyethoxy)-5-quinolylmethyl)-2,4-diaminopyrimidine,
2,4-diamino-5-(5-amino-6-methyl-8-quinolylmethyl)pyrimidine,
2,4-diamino-5-(5-amino-6-methoxy-8-quinolylmethyl)-pyrimidine,
2,4-diamino-5-(8-amino-7-methoxy-5-isoquinolylmethyl)-pyrimidine,
5-(7-allyl-8-methoxy-5-(1,2,3,4-tetrahydroquinolyl)methyl-2,4-diaminopyrimidine,
2,4-diamino-(7-methoxy-8-nitro-5-quinolylmethyl)pyrimidine,
2,4-diamino-5-(7,8-dimethoxy-4H-1-benzopyran-5-ylmethyl)pyrimidine,

or a salt or N-oxide thereof.

11. A method of inhibiting growth of susceptible bacteria which comprises using a compound or salt or formulation of a compound or salt of claims **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**, **9** or **10** against said susceptible bacteria.

4,587,343

CHROMOGENIC 3,3-BISINDOLYL-4-AZAPHTHALIDES

Davor Bedekovic, Therwil, and Ian J. Fletcher, Magden, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

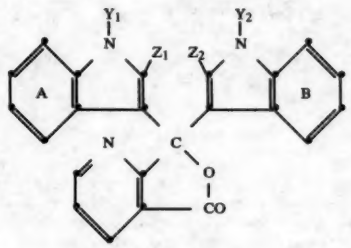
Filed May 1, 1984, Ser. No. 605,948

Claims priority, application Switzerland, May 9, 1983, 2524/83

Int. Cl.[4] **C07D** *491/048*

U.S. Cl. 546—116 **8 Claims**

1. A chromogenic 3,3-bisindolyl-4-azaphthalide of the formula



wherein

Y_1 is hydrogen, C_1–C_{12}alkyl which is unsubstitued or substituted by halogen, hydroxyl, cyano or lower alkoxy, or is C_1–C_{12}acyl, benzyl or benzyl substituted by halogen, nitro, lower alkyl or lower alkoxy,

Y_2 is C_6–C_9alkyl, which is unsubstituted or substituted by halogen, hydroxyl, cyano or lower alkoxy, and

Z_1 and Z_2, each independently of the other, are hydrogen, lower alkyl or phenyl, and

the rings A and B, each independently of the other, are unsubstituted or substituted by halogen, nitro, cyano, lower alkyl, lower alkoxy, lower alkoxycarbonyl, amino, mono-lower alkylamino or di-lower alkylamino.

4,587,344

ISOTHIOUREA SYNTHESIS PROCESS

Charles W. Ryan, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 464,296, Feb. 7, 1983, abandoned. This application Nov. 29, 1984, Ser. No. 676,370

Int. Cl.[4] **C07D** *277/30*

U.S. Cl. 548—205 **2 Claims**

1. A process for preparing N-methyl-S-methyl-N'-[2-(2-dimethylaminomethylthiazol-4-ylmethylthio)ethyl]isothiourea which process comprises reacting 2-dimethylaminomethyl-4-(2-aminoethyl)thiomethylthiazole with methylcarbonimidodithioic acid, dimethyl ester in the presence of at least about 1 mole of an acid per mole of the thiazole.

4,587,345

PROCESS FOR PREPARING THIENO-FUSED HETEROCYCLIC ANTI-ULCER AGENTS

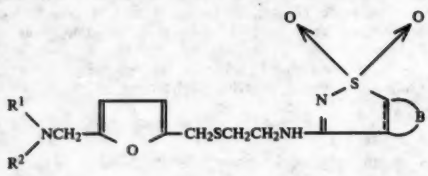
Guy A. Schiehser, Malvern, and Donald P. Strike, St. Davids, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Sep. 28, 1984, Ser. No. 655,978

Int. Cl.[4] **C07D** *513/04, 333/34*

U.S. Cl. 548—212 **2 Claims**

1. A process for the preparation of compounds of the formula



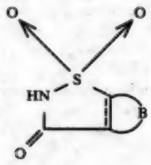
wherein

B is a moiety having the formula

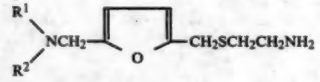
R is hydrogen, mono- or dihalo, nitro, cyano, trifluoromethyl, mercapto, lower alkyl, lower alkoxy, alkanoyl, lowercycloalkyl, carboxy, alkoxycarbonyl, mono- or di-lower alkyl substituted amino, alkanoylamino, lower alkyl thio, loweralkylsulfonyl, lower alkyl substituted sulfamoyl, phenyl or phenyl substituted with halo, lower alkyl, lower alkoxy, trifluoromethyl, cyano or nitro;

R^1 and R^2 are each lower alkyl

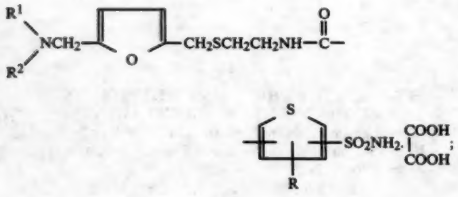
and the pharmacologically acceptable salts thereof, which comprises (A) reacting a suitable thienoisothiazole of the formula



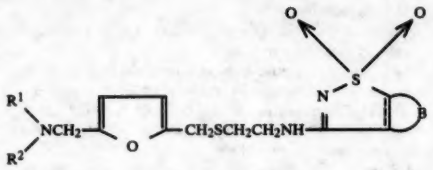
with an amine having the formula



wherein B, R^1 and R^2 are as defined hereinbefore, and treating the reaction mixture with oxalic acid to form the following intermediate



and (B) cyclizing the intermediate obtained in Step A in the presence of a cyclizing agent to yield a compound having the formula



wherein B, R^1 and R^2 are as defined hereinbefore, and if desired, converting a resulting free base into a pharmacologically acceptable salt.

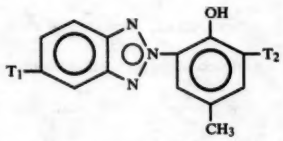
4,587,346

LIQUID 2-(2-HYDROXY-3-HIGHER BRANCHED ALKYL-5-METHYL-PHENYL)-2H-BENZOTRIAZOLE MIXTURES, STABILIZED COMPOSITIONS AND PROCESSES FOR PREPARING LIQUID MIXTURES

Roland A. E. Winter, Armonk, and Robert E. Detlefsen, Putnam Valley, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 22, 1985, Ser. No. 693,483
Int. Cl.[4] C07D *249/20*
U.S. Cl. 548—260 **22 Claims**

1. A process for preparing a normally liquid or non-crystalline mixture of benzotriazoles, suitable for stabilizing organic materials against light induced deterioration, which consists essentially of compounds of the formula



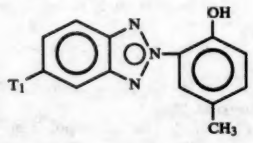
(I)

wherein

T_1 is hydrogen or chloro, and

T_2 is a random statistical mixture of at least three isomeric branched secondary alkyl groups each having 8 to 30 carbon atoms and having the formula

where E_1 is a straight chain alkyl of 1 to 14 carbon atoms and E_2 is a straight chain alkyl of 4 to 15 carbon atoms where the total number of carbon atoms in E_1 plus E_2 is 7 to 29, which process comprises alkylating a benzotriazole of the formula



where T_1 is hydrogen or chloro, with a straight chain alkene of 8 to 30 carbon atoms in the presence of an acidic catalyst at a temperature of 100 to 200° C.,

wherein the equivalent ratio of alkene to 2H-benzotriazole is 1:1 to 6:1, and the equivalents of acidic catalyst selected from the groups consisting of aliphatic, aromatic and substituted aromatic sulfonic acids, sulfuric acid, phosphoric acid, acidic

clays and acidic molecular sieves per equivalent of benzotriazole is 0.2 to 3.

4,587,347

N-PHENYL-N'-VINYLETHYLENEUREAS

Hans-Josef Buysch, Krefeld; Reinhold Klipper, Cologne; Peter M. Lange, Leverkusen, and Peter Mues, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

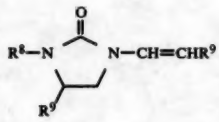
Filed Jul. 6, 1984, Ser. No. 628,175

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1983, 3324903

Int. Cl.[4] C07D *233/34*

U.S. Cl. 548—317 1 Claim

1. A N-vinyl ethyleneurea of the formula



in which

R^8 represents a phenyl radical which is optionally monosubstituted or polysubstituted by chlorine, bromine, a nitro group, a trifluoromethyl group, an alkoxy group having 1 to 4 carbon atoms or a carbalkoxy group having 1 to 4 carbon atoms, and

R^9 denotes hydrogen or methyl.

4,587,348

PROCESS FOR PREPARING HERBICIDAL 5-CYANO-1-PHENYL-N-METHYL-1H-PYRAZOLE-4-CARBOXAMIDE

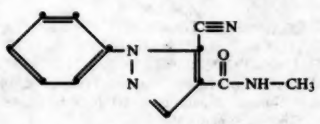
John Brennan, and Eddie V. P. Tao, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Sep. 6, 1984, Ser. No. 647,569

Int. Cl.[4] C07D *231/14*

U.S. Cl. 548—378 6 Claims

1. A process for preparing 5-cyano-1-phenyl-N-methyl-1H-pyrazole-4-carboxamide of the formula



comprising the following steps:

a. reacting a 5-chloro-1-phenyl-1H-pyrazole-4-carboxylic acid ester of the formula

wherein R^1 is C_1–C_6 alkoxy, with from about 2.0 to about 3.0 mole equivalents of sodium cyanide in from about 600 ml to about 1 l. of a suitable solvent per gram-mole of the 5-chloro-1-phenyl-1H-pyrazole-4-carboxylic acid ester at a temperture in the range of about 70° C. to about 150° C.; and

b. adding from about 2.0 to about 15.0 mole equivalents of methylamine to the reaction mixture, stirring the mixture at a temperature in the range of about 20° C. to about 40° C. and separating the final product.

4,587,349

1-AMINO-OR NITRO-BENZYLINDOLES USEFUL AS INTERMEDIATES

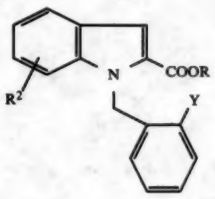
Chih Y. Ho, Lansdale, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.

Division of Ser. No. 540,262, Oct. 11, 1983, Pat. No. 4,529,724. This application Mar. 18, 1985, Ser. No. 712,945

Int. Cl.[4] C07D *209/12*

U.S. Cl. 548—491 6 Claims

1. An indole compound of the following formula (III):



(III)

wherein

R^2 is hydrogen, alkoxy of about 1 to 6 carbons, alkyl of about 1 to 6 carbons, trifluoromethyl, halo, nitro, hydroxy or dialkylamino of about 2 to 10 carbons;

R is alkyl of about 1 to 6 carbons; and

Y is NO_2 or NH_2.

4,587,350

PROCESS FOR THE PRODUCTION OF TRIMELLITIC ANHYDRIDE

Peter H. Kilner, Sunnyvale, Calif.; Joseph P. Egan, Jr., Plainfield, Ill.; Stephen G. Ceisel, Shorewood, Ill., and Wayne P. Schammel, Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 591,468, Mar. 20, 1984, Pat. No. 4,537,978. This application Jun. 14, 1985, Ser. No. 744,925

The portion of the term of this patent subsequent to Aug. 27, 2002, has been disclaimed.

Int. Cl.[4] C07D *307/89*

U.S. Cl. 549—245 4 Claims

1. A process for oxidizing pseudocumene to trimellitic anhydride which comprises catalytic oxidation of pseudocumene with air in the presence of acetic acid in an oxidation zone wherein liquid-phase conditions are maintained and wherein the weight ratio of acetic acid to pseudocumene is in the range of about 0.5–4.0:1.0 and the catalyst comprises one or more heavy metal oxidation catalysts comprising zirconium, cobalt, and manganese to provide about 0.1 to about 0.4 weight percent total metals based on pseudocumene and a source of bromine and to provide a total of about 0.10 to about 0.30 weight percent total bromine based on pseudocumene, wherein the total weight ratio of bromine ions to total metals ions is about 0.5 to about 2.0, the zirconium content is about 1 to about 5%, and the manganese content is about 14 to about 60%, each metal by weight of the total metals and wherein the cobalt content is about 35 to about 80 weight percent, the temperature in the last stage is upward from about 175° C. to about 250° C., the temperature in the preceding stage is between about 100° C. and about 165° C., and wherein acetic acid solvent and water of reaction are withdrawn during the last 5 to about 20% of the oxidation reaction.

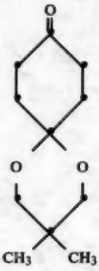
4,587,351

SYNTHESIS OF KETONES WITH CALCIUM HYPOCHLORITE

Randall K. Atkins, and Leland O. Weigel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 18, 1984, Ser. No. 601,753
Int. Cl.[4] C07D *319/08*
U.S. Cl. 549—333 **7 Claims**

1. A process for preparing a compound of the formula



comprising reacting a secondary alcohol of the formula

with calcium hypochlorite in acetonitrile in the presence of silica at a temperature in the range of about 15° C. to about 35° C.

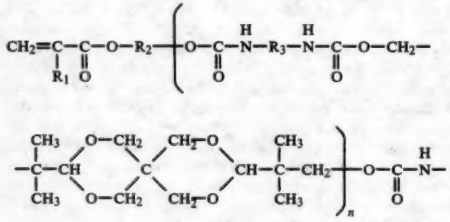
4,587,352

URETHANE (METH)ACRYLATE COMPOUNDS

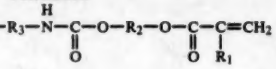
Yoshiji Masaoka, and Motonobu Kubo, both of Iwakuni, Japan, assignors to Sanyo-Kokusaku Pulp Co., Ltd., Tokyo, Japan

Filed Jun. 19, 1985, Ser. No. 746,314
Claims priority, application Japan, Jul. 16, 1984, 59-147133
Int. Cl.[4] C07D *319/00*
U.S. Cl. 549—335 **1 Claim**

1. A novel urethane (meth)acrylate compound represented by a general formula shown below.



-continued



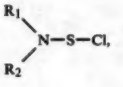
4,587,353

PROCESS FOR PRODUCING N-CHLOROSULFENYL COMPOUNDS

Hansjakob Fäh, Ormalingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

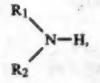
Filed Aug. 23, 1983, Ser. No. 525,598
Int. Cl.[4] C07C *161/00*; C07D *307/86*
U.S. Cl. 549—470 **8 Claims**

1. In a process for producing an N-chlorosulfenyl compound of the formula



(I)

in which R_1 is C_1–C_8-alkyl, C_1–C_8-alkoxycarbonyl, C_1–C_8-alkoxycarbonyl-C_1–C_6-alkyl or 2,3-dihydro-2,2-dimethylbenzofuran-7-yloxycarbonyl, and R_2 is C_1–C_8-alkyl or C_1–C_8-alkoxycarbonyl-C_1–C_6-alkyl, by reaction of an amino compound of the formula II



(II)

in which R_1 and R_2 have the meanings defined under the formula I, with sulfur dichloride, the improvement which comprises performing the reaction of the amino compound of the formula II with sulfur dichloride at 10°–60° C., in excess sulfur dichloride as solvent and in the absence of a base, and obtaining the formed N-chlorosulfenyl compound of the formula I by evaporating off the unreacted sulfur dichloride.

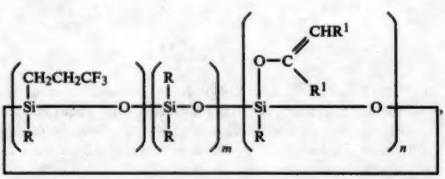
4,587,354

NOVEL ORGANOSILICON COMPOUND AND A ROOM TEMPERATURE CURABLE ORGANOPOLYSILOXANE COMPOSITION CONTAINING THE SAME

Toshio Takago; Yoshio Inoue; Masami Terashima, and Shiniti Sato, all of Gunma, Japan, assignors to Shin-Etsu Chemical, Co., Ltd., Tokyo, Japan

Filed Mar. 20, 1984, Ser. No. 591,380
Claims priority, application Japan, Mar. 28, 1983, 58-51810; Apr. 4, 1983, 58-59031
Int. Cl.[4] C07F *7/08, 7/10*
U.S. Cl. 556—417 **2 Claims**

1. A cyclic organopolysiloxane compound represented by the general formula



in which the groups denoted by R are each a halogen- or cyano-substituted or unsubstituted monovalent hydrocarbon

group having from 1 to 8 carbon atoms or a trimethylsiloxy group independently from the others, the groups denoted by R^1 are each a hydrogen atom or a substituted or unsubstituted monovalent hydrocarbon group having from 1 to 8 carbon atoms independently from the other, the suffix m is a number of 0, 1 or 2 and the suffix n is a number of 1, 2 or 3 with the proviso that m+n is 3 or 4.

4,587,355

OXIDATION WITH A SOLID CATALYST

Albert P. Brown, Downers Grove, and John G. Hundley, St. Charles, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Aug. 22, 1984, Ser. No. 643,153
Int. Cl.[4] C07C *51/265*
U.S. Cl. 562—414 **8 Claims**

1. A method for producing an aromatic carboxylic acid by the liquid phase oxidation of an alkyl aromatic with an oxygen-containing gas in a solvent at an elevated temperature and pressure and in the presence of an oxidation catalyst comprising cobalt, manganese and bromine components, wherein at least a portion of the cobalt and manganese catalyst components initially contacted with the alkyl aromatic and oxygen-containing gas is in the form of solid cobalt and manganese oxalates, wherein (1) the resulting reaction mixture comprised the aromatic carboxylic acid product and cobalt and manganese cations dissolved in the solvent, (2) at least a major portion of the aromatic carboxylic acid product is separated from the solvent, (3) oxalic acid or an oxalate salt is introduced into at least a portion of the solvent to precipitate cobalt and manganese oxalates, and (4) the precipitated cobalt and manganese oxalates are separated from the solvent and recycled to the liquid phase oxidation.

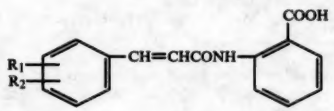
4,587,356

PROCESS FOR THE PRODUCTION OF NUCLEAR SUBSTITUTED CINNAMOYLANTHRANILIC ACID DERIVATIVES

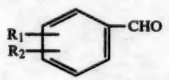
Kinji Iizuka, Kanbayashi; Tetsuhide Kamijo, Hirookayoshida; Ryoji Yamamoto, Kanbayashi, and Hiromu Harada, Matsumoto, all of Japan, assignors to Kissei Pharmaceutical Co., Ltd., Japan

Continuation-in-part of Ser. No. 577,758, Feb. 7, 1984, Pat. No. 4,486,597, which is a continuation of Ser. No. 405,159, Aug. 6, 1982, abandoned. This application Sep. 25, 1984, Ser. No. 654,231
Int. Cl.[4] C07C *99/00*
U.S. Cl. 562—455 **12 Claims**

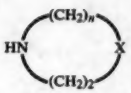
1. A process for the production of a nuclear substituted cinnamoylanthranilic acid derivative corresponding to the formula:



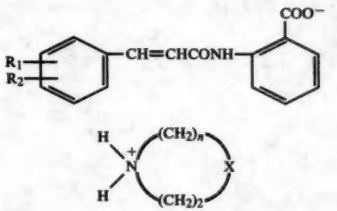
where R_1 is hydroxy and R_2 is an alkoxyl group containing about 1–3 carbon atoms, which process comprises (1) reacting in an inert organic solvent medium a nuclear substituted benzaldehyde derivative corresponding to the formula:



where R_1 and R_2 are as previously defined, with 2-carboxymalonanilic acid and a cyclic amine corresponding to the formula:



where X is a methylene group or an oxygen atom, n is 1 or 2 with the proviso that n is 2 when X is an oxygen atom, and said cyclic amine is employed in a molar ratio of about 2–10 moles per mole of substituted benzaldehyde derivative reactant or 2-carboxymalonanilic acid reactant, to produce a crystalline precipitate of an intermediate compound corresponding to the formula:



where R_1, R_2, n and X are as previously defined; and (2) treating the intermediate compound with an acidic reagent to yield a nuclear substituted cinnamoylanthranilic acid product corresponding to the first formula above.

4,587,357

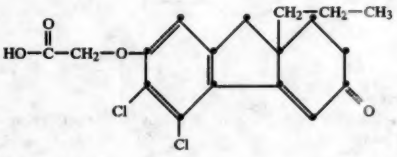
PREPARATION OF ENANTIOMERS OF A SUBSTITUTED FLUORENYLOXYACETIC ACID

Apurba Bhattacharya, Rahway, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 1, 1984, Ser. No. 656,577
Int. Cl.[4] C07C *59/84, 69/76*
U.S. Cl. 562—461 **7 Claims**

1. A process for preparing an isomer of a compound having the formula:

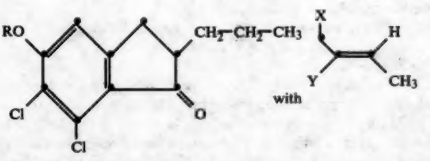
I



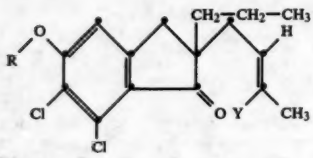
which comprises:

(a) treating a compound of the formula:

II



in a basic medium in the presence of a chiral catalyst to obtain:

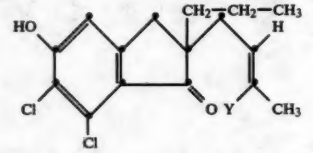


III

rich in the (+) or (−) isomer, wherein R is C_1–C_6 alkyl, phenyl, or phenyl C_1–C_6-alkyl

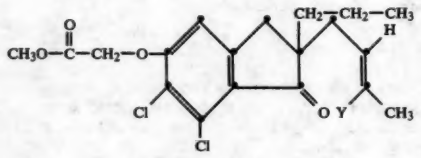
(b) crystallizing III from a hydrocarbon solvent to obtain pure (+) or (−) isomer,

(c) treating III obtained from (b) with $NaNO_2$ in an aprotic solvent or LiCl in N-methylpyrrolidinone to obtain:



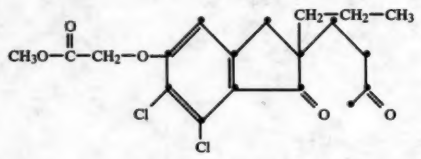
IV

(d) alkylating IV to obtain:



V

(e) treating V with H_2SO_4/CH_2Cl_2 to obtain:



VI

and,

(f) treating VI with a base to obtain the I product; wherein X and Y are Cl or Br.

4,587,358

PRODUCTION OF HIGH-STRENGTH, STORAGE-STABLE PARTICULATE UREA

Glenn M. Blouin, Florence, Ala., assignor to Tennessee Valley Authority, Muscle Shoals, Ala.

Filed Aug. 26, 1985, Ser. No. 769,095

Int. Cl.[4] C07C *85/26, 126/10*

U.S. Cl. 564—3 **7 Claims**

1. An improved product resulting from the production of hard, free-flowing, storage-stable particulate urea, each particle thereof being substantially homogeneous and consisting essentially of an admixture of urea and a water-soluble metal or ammonium salt of lignosulfonic acid, the quantity of said salt ranging from about 0.1 percent to about 5 percent by weight of said admixture.

4. An improved method of imparting to particulate urea the properties of substantially increased resistance to breaking under impact, of non-agglomeration during prolonged storage, and of reduced dusting during melt-granulation process to form said particulates, which improved method comprises the steps of:

(1) mixing water-soluble metal or ammonium lignosulfonates or both into an essentially anhydrous molten melt of urea or highly concentrated urea synthesis solutions subsequently utilized to produce said melt until a homogeneous mixture thereof results and

(2) subsequently converting said melt into particulate form, said improved method characterized by the fact that the resulting individual particulates contain from about 0.1 percent to 5.0 percent by weight of said lignosulfonate.

4,587,359

AMINE-CARBAMOYLBORANE ADDUCTS

Bernard F. Spielvogel, Raleigh; Andrew T. McPhail, Durham, and Iris H. Hall, Chapel Hill, all of N.C., assignors to The United States of America as represented by the Secrtary of the Army, Washington, D.C.

Filed May 17, 1984, Ser. No. 611,247

Int. Cl.[4] C07F *5/02*

U.S. Cl. 564—8 **8 Claims**

1. A compound of the formula $R_1R_2NH.BH_2C(O)NHR_3$ wherein R_1 and R_2 can be the same or different and are H or a lower alkyl, and R_3 is a lower alkyl.

4,587,360

ANTI-ARRHYTHMIC AGENTS

George C. Buzby, Jr., Blue Bell, Pa., assignor to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 717,739, Mar. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 609,151, May 11, 1984, Pat. No. 4,539,426. This application Apr. 16, 1985, Ser. No. 723,685

The portion of the term of this patent subsequent to Sep. 3, 2002, has been disclaimed.

Int. Cl.[4] C07C *143/72, 143/78, 143/80*

U.S. Cl. 564—92 **1 Claim**

1. A compound which is N-[3-[[2-(3,4-dimethoxyphenyl)ethyl]methylamino]propyl]-N-(1-methylethyl)-2,3,4-trimethoxy-benzenesulfonamide or a pharmaceutically acceptable salt thereof.

4,587,361

ANTHELMINTIC BENZAMIDES

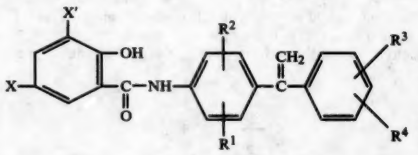
Alfred W. Chow, Radnor, and Vassilios J. Theodorides, West Chester, both of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed May 7, 1984, Ser. No. 607,498

Int. Cl.[4] C07C *103/26, 67/02*

U.S. Cl. 564—179 **12 Claims**

1. An anthelmintic composition for internal administration comprising an anthelmintic but nontoxic quantity of a compound of the formula:



in which:

X and X' are, each, halo; and

R^1, R^2, R^3 and R^4 are, each, hydrogen, methyl or halo, or an O-C_{2-6}-alkanoyl derivative thereof, combined with a pharmaceutical, animal feed or veterinary carrier.

4,587,362

PROCESS FOR PREPARING OLIGOMERIC OR POLYMERIC METHYL PHOSPHONAMIDES

Milton L. Honig, Bronx, and Edward D. Weil, Hastings-on-Hudson, both of N.Y., assignors to Stauffer Chemical Company, Dobbs Ferry, N.Y.

Continuation of Ser. No. 157,713, Jun. 9, 1980, Pat. No. 4,456,566, which is a division of Ser. No. 072,966, Sep. 6, 1979, Pat. No. 4,276,234, which is a division of Ser. No. 973,282, Dec. 26, 1978, Pat. No. 4,207,271, which is a division of Ser. No. 615,321, Sep. 22, 1975, Pat. No. 4,152,373. This application Mar. 5, 1984, Ser. No. 586,158

The portion of the term of this patent subsequent to Jun. 21, 2001, has been disclaimed.

Int. Cl.[4] C07F *9/36*

U.S. Cl. 564—013 6 Claims

1. A process for preparing oligomeric or polymeric methylphosphonamides which comprises heating a diaryl methylphosphonate with an amine until phenol corresponding to the aryl groups of the diaryl methylphosphonate is released.

4,587,363

CONTINUOUS PREPARATION OF OXYGEN-CONTAINING COMPOUNDS

Jürgen Hartig, Gruenstadt; Gunter Schuch, Ludwigshafen; Armin Stoessel, Frankenthal; Guenter Herrmann, Heidelberg; Arthur Brunner, Ludwigshafen; Peter Zehner, Ludwigshafen, and Otto-Alfred Grosskinsky, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 10, 1984, Ser. No. 639,325

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1983, 3328771

Int. Cl.[4] C07C *45/33*

U.S. Cl. 568—357 5 Claims

1. A process for the continuous preparation of cyclohexanol and cyclohexanone by oxidizing cyclohexane in the liquid phase with a gas containing molecular oxygen, at elevated temperatures and under superstmospheric pressure, wherein the said gas is fed into the liquid reaction mixture, in a downward direction, at several points along the reaction zone via nozzle apertures, so that it emerges at each nozzle aperture at a velocity of from 0.01 to 1 m/sec in an amount of from 0.001 to 10 liters per second per nozzle aperture, and the said reaction mixture is brought into substantially uniform contact with the gas containing molecular oxygen, over the volume of the reaction zone.

4,587,364

HYDROFORMYLATION PROCESS EMPLOYING UNMODIFIED OSMIUM-COBALT CATALYST

James L. Cooper, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 21, 1984, Ser. No. 612,210

Int. Cl.[4] C07C *45/50*

U.S. Cl. 568—451 8 Claims

1. The hydroformylation process for producing relatively low normal/branched aldehydes comprising contacting olefin having from 2 to 20 carbons in a reaction zone at a temperature of from about 60° C. to about 250° C. and a pressure of from about 750 psig to about 10,000 psig with hydrogen and carbon monoxide in the presence of a catalyst containing from 10^{-6} to about 10^{-3} moles of osmium per mole of said olefin and also containing cobalt, the molar ratio of Os/Co being from about 1/10 to about 1,000/1, for a sufficient period of time to permit reaction of said olefin with said hydrogen and carbon monoxide to form aldehyde product.

4,587,365

PREPARING CAPPED POLYOXYALKYLENE POLYOLS

Michael J. Anchor, Canton Township, Wayne County, Mich., assignor to BASF Corporation, Wyandotte, Mich.

Filed Oct. 29, 1984, Ser. No. 666,208

Int. Cl.[4] C07C *41/16*

U.S. Cl. 568—619 18 Claims

1. A process for preparing a capped polyoxyalkylene polyol having the structural formula:

$$R(A)_mOR$$

wherein A is an oxyalkylene group selected from oxyethylene, oxypropylene, oxybutylene, oxytetramethylene and heteric and block mixtures thereof; m is a whole number selected to give an overall average molecular weight of the product of about 500 to 15,000 and R is selected from the group consisting of benzyl, aryl, substituted benzyl, substituted aryl, and C_1 to C_4 aliphatic groups and wherein the R groups may be the same or different which process comprises:

reacting a polyoxyalkylene compound having the structural formula:

$$Q(A)_mOH$$

wherein Q is H or R and A and m are as previously defined with an alkali metal alkoxide followed by reaction with an alkali metal hydride followed by reaction with an organic halide having the formula:

$$RX$$

wherein X is a halide and R is as previously defined.

4,587,366

PROCESS FOR PREPARING FLUOROALKYL-SUBSTITUTED IODOALKANES

Konrad von Werner, Halsbach, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 19, 1984, Ser. No. 663,084

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1983, 3338300

Int. Cl.[4] C07C *17/28, 21/18*

U.S. Cl. 570—172 6 Claims

1. A process for preparing a monoaddition compound of the formula

in which

R_f denotes a perfluorinated alkylene radical which is straight-chain and has 1 to 15 carbon atoms, which is branched and has 3 to 15 carbon atoms or which is cyclic and has 4 to 8 carbon atoms,

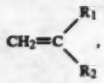
X denotes hydrogen, fluorine, chlorine, bromine or iodine, and

R_1 and R_2 are identical or different and each denotes: hydrogen, fluorine, chlorine, a perfluoroalkyl radical having 1 to 12 carbon atoms, a perfluoroalkyl radical having 1 to 10 carbon atoms and in which a fluorine atom is replaced by hydrogen or chlorine, an alkyl radical having 1 to 20 carbon atoms, an alkenyl radical having 2 to 20 carbon atoms, an aryl radical having 6 to 10 carbon atoms, an arylalkyl radical having 7 to 12 carbon atoms, or a substituent of the last four types substituted by flourine, chlorine, —OH or —OR', in which R' denotes an alkyl or alkylcarboxyl radical having 1 to 5 carbon atoms,

which comprises reacting a compound of the formula

XR_5R_6

with a compound of the formula



wherein X, R_5, R_1 and R_2 are as defined above, under heat and under atmospheric pressure or superatmospheric pressure in the presence of 0.1 to 10 mol%, based on whichever of the two reacting compounds is used in the smaller number of moles, of at least one metal catalyst which, in the periodic table of the elements, has one of the atomic numbers 24 to 30, 42 to 48 or 74 to 79 and is in finely divided form.

4,587,367

PROCESS FOR THE PRODUCTION OF DICHLOROISOBUTENES

Dieter J. Mueller, Marl, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Apr. 25, 1985, Ser. No. 727,177

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1984, 3415335

Int. Cl.[4] C07C *17/06*

U.S. Cl. 570—216 **14 Claims**

1. A process for the preparation of 1,3-dichloro-2-methylpropene and 3-chloro-2-chloromethylpropene which comprises reacting 3-chloro-2-methylpropene with sulfuryl chloride in the presence of a catalytically effective amount of an amine or a phosphine.

4,587,368

PROCESS FOR PRODUCING LUBRICANT MATERIAL

Robert E. Pratt, Los Angeles, Calif., assignor to Burmah-Castrol, Inc., Hackensack, N.J.

Filed Dec. 27, 1983, Ser. No. 565,621

Int. Cl.[4] C10L *1/16*; C07C *2/02*

U.S. Cl. 585—12 **24 Claims**

1. A process for producing a synthetic lubricant material comprising oligomerizing C_8–C_{12} alpha-olefin monomer in the presence of an alcohol promoted boron trifluoride catalyst until said monomer has substantially reacted to produce an intermediate oligomer, controlledly adding over a predetermined period a further aliquot of monomer to said intermediate oligomer and while continuing the oligomerization essentially to completion thereby to obtain a higher oligomer product.

21. A synthetic lubricant product produced by oligomerization of a C_8–C_{12} alpha-olefin monomer comprising a substantially saturated oligomer mixture of;

(a) less than 15% trimer,

(b) 30 to 50% tetramer, and

(c) 50 to 85% of combined and tetramer and pentamer.

4,587,369

SELECTIVELY HYDROGENATING ACETYLENIC COMPOUNDS IN A HIGH BUTADIENE CONTENT C_4 CUT

Jean Cosyns, Maule, and Jean-Paul Boitiaux, Poissy, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Oct. 25, 1984, Ser. No. 664,654

Claims priority, application France, Oct. 25, 1983, 83 16943

Int. Cl.[4] C07C *5/08*

U.S. Cl. 585—259 **16 Claims**

1. In a process for selectively hydrogenating a C_4 hydrocarbon cut containing butadiene and at least one acetylenic hydrocarbon of the group comprising butynes and vinylacetylenes, wherein said cut, in the liquid phase, is contacted with a palladium catalyst deposited on alumina, and said C_4 cut is treated with hydrogen to selectively hydrogenate said acetylenic compounds, the improvement comprising conducting said hydrogenating of said C_4 cut in admixture with at least one aromatic hydrocarbon and at least one amine compound, said aromatic hydrocarbon being substantially inert during the hydrogenation and separable, at a later stage, from the reaction product, said amine compound being a primary or secondary amine.

4,587,370

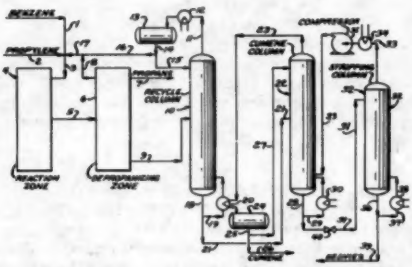
AROMATIC HYDROCARBON ALKYLATION PROCESS PRODUCT RECOVERY METHOD

Richard R. DeGraff, Deerfield, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jun. 5, 1985, Ser. No. 741,331

Int. Cl.[4] C07C *2/64*

U.S. Cl. 585—450 **17 Claims**



1. A process for the production of an alkylaromatic hydrocarbon which comprises contacting a feed acyclic olefinic hydrocarbon and a feed aromatic hydrocarbon with an alkylation catalyst in an alkylation reaction zone maintained at alkylation-promoting conditions and producing a reaction zone effluent stream comprising the feed aromatic hydrocarbon, a product alkylaromatic hydrocarbon and high-boiling by-product hydrocarbons and subsequently recovering the product alkylaromatic hydrocarbon by a method which comprises the steps of:

(a) passing a process stream comprising the feed aromatic hydrocarbon, the product alkylaromatic hydrocarbon and the by-product hydrocarbons into a recycle fractionation column operated at conditions which effect the separation of entering hydrocarbons into at least a net overhead stream, which is rich in the feed aromatic hydrocarbon, and a first bottoms stream, which comprises the product alkylaromatic hydrocarbon and the by-product hydrocarbons;

(b) passing the first bottoms stream into a product fractionation column operated at conditions effective to separate entering hydrocarbons into a first overhead vapor stream, which is rich in the product alkylaromatic hydrocarbon, and a second bottoms stream, which is rich in the product alkylaromatic hydrocarbon and also comprises the by-product hydrocarbons;

(c) at least partially condensing the first overhead vapor stream in a reboiler means supplying heat to a lower portion of the recycle column, withdrawing a first portion of the resultant condensate from the process as a net product stream and returning a second portion of the condensate to the product column as reflux liquid;

(d) passing the second bottoms stream into a stripping column operated at fractional distillation conditions, including a lower pressure than is maintained in the product fractionation column, and effective to separate entering hydrocarbons into a second overhead vapor stream comprising the product alkylaromatic hydrocarbon and a third bottoms stream, which comprises the by-product

hydrocarbons and is substantially free of the product alkylaromatic hydrocarbon; and,

(e) compressing the second overhead vapor stream and then passing the second overhead vapor stream into the product fractionation column.

4,587,371
HYDROCARBON CONVERSION OF SULFUR CONTAMINATED FEED STOCK

Cleve H. Forward; James R. Butler, and William P. Licht, all of Big Spring, Tex., assignors to Cosden Technology, Inc., Dallas, Tex.

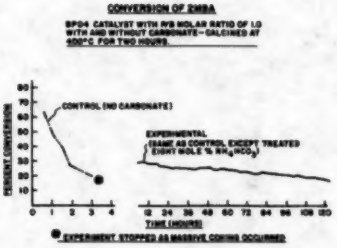
Filed Aug. 27, 1984, Ser. No. 644,885
Int. Cl.[4] C07C 2/68
U.S. Cl. 585—467 **7 Claims**

1. In the alkylation of aromatic hydrocarbons the method comprising passing a feedstream of an alkylating agent and an aromatic substrate and containing sulfur in an amount greater than two ppm to a reaction zone containing a crystalline silica polymorph silicalite catalyst under conditions providing for the alkylation of said aromatic substrate.

4,587,372
BORON PHOSPHATE CATALYST FOR THE PRODUCTION OF DIENES FROM ALDEHYDES

Wen-Liang Hsu, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 2, 1985, Ser. No. 761,728
Int. Cl.[4] C07C 1/20
U.S. Cl. 585—606 **7 Claims**


CONVERSION OF EMBA
BPO4 CATALYST WITH P/B MOLAR RATIO OF 1.0 WITH AND WITHOUT CARBONATE—CALCINED AT 400°C FOR TWO HOURS.
CONTROL (NO CARBONATE)
EXPERIMENTAL (SAME AS CONTROL EXCEPT TREATED WITH MOLE % NH4HCO3)
PERCENT CONVERSION
TIME (HOURS)
EXPERIMENT STOPPED AS MASSIVE COKING OCCURRED

1. A process for the conversion of an aldehyde to the corresponding diene which comprises contacting the aldehyde in the vapor phase at a temperature of from 200° to 400° C. with a boron phosphate catalyst, the improvement characterized in that (1) the boron phosphate catalyst is prepared by:

(a) combining phosphoric acid and boric acid;

(b) at such ratios that the molar ratio of P/B is less than 1.1 but more than 0.9;

(c) admixing the boron phosphate with from 0.1 to 10 mole percent based on moles of boron of an ammonium carbonate, selected from NH_4HCO_3 and $(NH_4)_2CO_3$;

(d) calcining the admixture in air at a temperature of from 300° to 500° C. for 1 to 6 hours.

4,587,373
DIMETHYLETHER RECOVERY AND/OR RECYCLE IN AN MTC CONVERSION PLANT

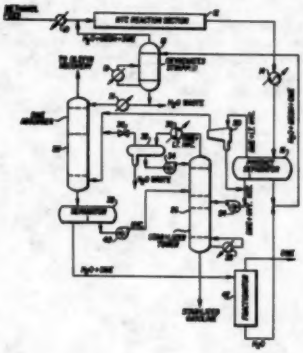
Chung H. Hsia, Matawan, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 12, 1984, Ser. No. 680,712
Int. Cl.[4] C07C 1/20
U.S. Cl. 585—639 **8 Claims**

1. A process for recovering DME from the product stream exiting an MTC reactor, wherein said product stream is separated into a liquid hydrocarbon stream, a vaporous hydrocarbon stream and an aqueous liquid stream, both hydrocarbon streams including dissolved DME, said process comprising the steps of:

reboiling said liquid hydrocarbon stream at least to remove dissolved DME in a stabilizer tower and removing bottoms of said stabilizer tower as a liquid hydrocarbon product stream;

combining overheads of said stabilizer tower comprising said at least DME removed from said liquid hydrocarbon stream with said vaporous hydrocarbon stream to form a



first combination and passing the first combination to a DME absorber tower;

absorbing DME from said first combination in said absorber tower;

removing overheads from the DME absorber tower as a vaporous hydrocarbon product; and

combining at least a portion of DME absorber tower bottoms with said aqueous liquid stream to form a second combination and recycling said second combination as an input to said MTC reactor.

4,587,374
OLEFIN ISOMERIZATION PROCESS

Bruce C. Peters, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 592,536, Mar. 26, 1984, abandoned. This application Mar. 25, 1985, Ser. No. 715,824
Int. Cl.[4] C07C 5/25, 5/22, 5/13
U.S. Cl. 585—670 **6 Claims**

1. A process for isomerizing the olefinic double bond of a vinylidene olefin containing about 12–20 carbon atoms and having the structure:

$$R'-CH_2-CH_2-(CH_2)_n-\underset{\displaystyle R''}{\overset{\displaystyle |}{C}}=CH_2$$

wherein R' and R'' are aliphatic hydrocarbon groups and n is an integer from 0–10, said process comprising contacting said vinylidene olefin with a catalytic amount of an iron carbonyl at a temperature of about 150°–350° C. whereby the major isomerization product of said vinylidene olefin is a di-substituted internal olefin having the structure:

$$R'''-CH=CH-(CH_2)_n-\underset{\displaystyle R''}{\overset{\displaystyle |}{C}}-CH_3$$

wherein R''' and R'' are aliphatic hydrocarbon groups and n is an integer from 0–10 and only a minor amount of tri-substituted internal olefin.

4,587,375

PROCESS FOR THE ISOMERIZATION OF OLEFINS

Guy L. G. Debras, Belgrade; Georges E. M. J. De Clippeleir, Sint Pieters, and Raymond M. Cahen, Brussels, all of Belgium, assignors to Labofina, S.A., Brussels, Belgium

Filed Apr. 3, 1985, Ser. No. 719,198

Claims priority, application Luxembourg, Apr. 3, 1984, 85285

Int. Cl.[4] C07C 5/27

U.S. Cl. 585—671 10 Claims

1. A process for the isomerization of n-butenes wherein said process comprises the steps of:

(a) contacting at a temperature of about 300° C. or higher, a feed containing at least 10% by volume n-butenes with a catalyst consisting essentially of a crystalline silica polymorph silicalite in the presence of a sufficient amount of steam such that the water/feed molar ratio is from about 0.5 to about 5; and

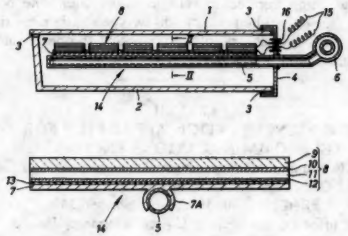
(b) recovering a stream containing isobutene.

4,587,376

SUNLIGHT-INTO-ENERGY CONVERSION APPARATUS

Haruhisa Kosaka, Nara, and Daizo Takaoka, Takatsuki, both of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Sep. 6, 1984, Ser. No. 647,989
Claims priority, application Japan, Sep. 13, 1983, 58-170488; Dec. 20, 1983, 58-241486
Int. Cl.[4] H01L *31/04*; F24J *2/42*
U.S. Cl. 136—248 10 Claims



1. A sunlight conversion apparatus for converting solar energy to electrical and thermal energy, comprising:

at least one solar cell having an amorphous silicon layer;

a superstrate, said amorphous silicon layer being integrally joined to said superstrate;

a heat collecting plate attached to said at least one solar cell, at a surface thereof opposite said superstrate;

a metallic electrode formed on said amorphous silicon layer on a side thereof facing said heat collecting plate; and

a container enclosing said solar cell superstrate, heat collecting plate, and metallic electrode;

wherein said superstrate is comprised of a light permeable, heat absorbing material that is transparent to solar energy of a range of wavelengths that is substantially absorbed by said amorphous silicon layer, and substantially absorbs solar energy of a range of wavelengths that is substantially not absorbed by said amorphous silicon layer, said superstrate converting said energy it absorbs into thermal energy.

4,587,377

ELECTRICALLY INSULATING FASTENER FOR HEAT SINKS OF DIFFERENT THICKNESSES

William G. Rodseth, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Sep. 21, 1984, Ser. No. 653,111
Int. Cl.[4] H01B *17/24*
U.S. Cl. 174—16 HS 4 Claims

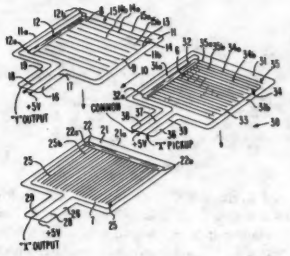
1. An insulator for use in electrically isolating a plurality of heat generating components attached to a heat sink of predetermined thickness, said insulator comprising a generally flat spacer having means for attaching said spacer to an associated nut, a collar integrally formed with and extending from said spacer, a movable sleeve pre-assembled to and carried by said collar, said collar and said sleeve projecting generally perpendicularly from said spacer, said collar and said sleeve being generally concentrically disposed tubular elements having a predetermined longitudinal extent , said sleeve being a resilient collapsible rubber sleeve fitted over said collar , whereby, upon assembly of said components to said heat sink, said longitudinal extent is reducible to generally equal said thickness thereby fully insulating said components from said heat sink.

4,587,378

TWO-LAYER TOUCH TABLET

Cecil A. Moore, San Jose, Calif., assignor to Koala Technologies Corporation, San Jose, Calif.

Filed Jul. 30, 1984, Ser. No. 636,059
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—18 7 Claims



1. A multi-layer passive touch tablet comprising:

a first insulative layer having a first resistive coated bar extending along a first edge of said layer and a first series of conductive spaced parallel pathways extending orthogonally from said bar across said layer;

a conductive strip extending along a second edge of said layer opposed to said first edge and a second series of conductive spaced parallel pathways extending from said strip toward said bar and interdigitated with said first series of pathways;

a second insulative layer normally spaced from said first layer, said second layer having a second resistive coated bar extending along a first edge of said second layer orthogonally opposite said first bar and a third series of conductive spaced parallel pathways extending from said second bar toward an opposed second edge of said second layer, wherein said third series of pathways are orthogonal with and facing said first and second series of pathways;

means for applying an electrical potential to a location on each of said bars, an end of each of said bars displaced from said location being connected to a reference potential;

means for simultaneously bringing a discrete area of said first and second series of pathways into contact with said third series of pathways when one of said layers is pressed by a force against the other layer; and

means for simultaneously outputting voltage or resistance readings representative of a linear distribution of potential or resistance along each of said bars indicating x-axis and y-axis coordinates of the area pressed.

4,587,379

CARD AUTHENTICATING APPARATUS FOR CARD-BASED TRANSACTION PROCESSING SYSTEM

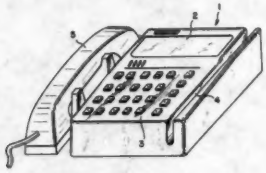
Kiyoshi Masuda, Osaka, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Mar. 23, 1984, Ser. No. 592,979
Claims priority, application Japan, Mar. 24, 1983, 58-49575
Int. Cl.[4] H04M *11/00*
U.S. Cl. 179—2 CA 7 Claims

1. A card authenticating apparatus for a card-based transaction processing system comprising:

(a) means for designating a given one of card issuers who corresponds to a card placed in said card authenticating apparatus;

(b) means for producing a command requesting communication with an operator of said card issuer;
(c) first memory means for storing data representing the telephone numbers of center units of said card issuers;
(d) second memory means for storing operator telephone numbers of said card issuers;
(e) automatic dialing means for automatically and selectively establishing connection of a telephone line to said operator's telephone of said designated card issuer or a center unit of said designated card issuer and;



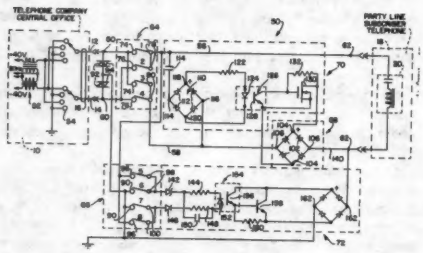
means for controlling operation of said automatic dialing means wherein said controlling means activates said automatic dialing means to read out a center unit telephone number of said designated card issuer from said first memory means when said designating means is enabled; and
wherein said controlling means activates said automatic dialing means to read out an operator telephone number of said designated card issuer from said second memory means when said command requesting means is enabled.

4,587,380

INTERFACE FOR CONNECTING STANDARD TELEPHONES TO PARTY LINES

Leonard E. Curtin, Houston, Tex., assignor to Harris Corporation, Melbourne, Fla.

Filed Jun. 14, 1984, Ser. No. 620,737
Int. Cl.[4] H04M *1/70, 3/16*
U.S. Cl. 179—17 A **5 Claims**



1. A party line interface for connecting a standard telephone to a party line having a pair of lines for conducting audible frequency signals between a telephone central office and a party line subscriber whose telephone is selectively rung by the central telephone office by the application of a ringing signal to one side of a ringing circuit in the subscriber's telephone and ground to the other side of the ringing circuit, the ringing signal including a DC component of either a positive or negative polarity referenced with respect to ground and a time varying signal applied to one of said pair of lines in said party line and a ground reference applied to the second of said pair of lines comprising:

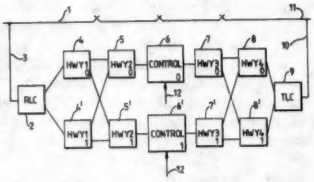
(a) A signal path for conducting audible frequency signals having two lines with each line having an input terminal and an output terminal, said input terminals being respectively adapted to be connected to different lines of said pair of lines of said party line and said output terminals being respectively adapted to be connected to different lines of said standard telephone; and
(b) programmable switching means coupled to said signal path for selectively applying said ringing signal received by said party line interface from said central telephone office to one of said output terminals for application to a ringing mechanism within said standard telephone as a function of the polarity of said DC component and ground reference applied to said input terminals, said ringing signal being applied to said standard telephone by said interface only when one of said two polarities provided by said party line central office is applied to one of said pair of lines of the party line.

4,587,381

LINE IDENTIFICATION APPARATUS FOR A TELECOMMUNICATIONS EXCHANGE

Robert Cheetham, Coventry, England, assignor to The General Electric Company, P.L.C., England

Filed Nov. 30, 1983, Ser. No. 556,343
Claims priority, application United Kingdom, Dec. 2, 1982, 8234416
Int. Cl.[4] H04Q *1/30, 3/78*
U.S. Cl. 179—18 FH **19 Claims**



1. A telecommunications exchange of the kind having switched speech pairs and additional wires which are switched in parallel with the speech pairs wherein the improvement comprises detection means responsive to changes in the electrical state of connections through the exchange at each of a plurality of call logging points to cause a data signal to be supplied to the additional wires at each call logging point at which such a change is detected which data signal comprises a plurality of data bits identifying the particular call logging point, a plurality of receivers each arranged to scan the additional wires of a plurality of line circuits of the exchange, which line circuits are individual to that receiver, to detect the presence of a data signal as aforesaid supplied thereto over an additional wire path through the exchange, each of said receivers is arranged to modify the received data signal so detected by the addition of a plurality of data bits which identify the particular additional wire of those scanned by the receiver and is arranged to transmit the modified data to a receiver multiplexer which is common to said plurality of receivers and which further modifies the data signal by the addition of a plurality of data bits identifying the particular receiver supplying the modified data signal, the further modified data signal being utilised to identify the line circuit to which the particular call logging point is connected.

4,587,382

ECHO CANCELLER USING END DELAY MEASUREMENT

Sung M. Yang, Newark, Calif., assignor to GTE Lenkurt Incorporated, Phoenix, Ariz.

Filed Jul. 29, 1982, Ser. No. 403,171
Int. Cl.[4] H04B *3/20*
U.S. Cl. 179—170.2 **8 Claims**

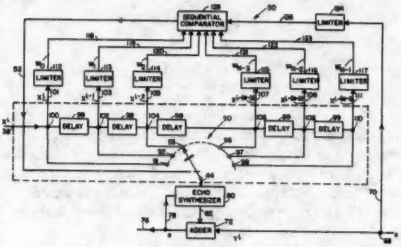
1. In a communication system having first and second one way transmission paths, an echo canceller which comprises:
an end delay analyzer circuit having first and second inputs

electrically connected to the first and second paths, respectively, and providing a control signal at an output, which signal is a measure of an end delay;

a variable delay circuit having one input electrically connected to said first path, having a second input receiving said control signal and being responsive thereto to adjust said variable delay so as to provide at an output thereof a delayed sample of a first path signal with a delay that is equal to said end delay;

transversal filter echo synthesizer means responsive to said delayed sample of the signal on said first path and producing an output signal; and

means connected in said second path for algebraically combining signals in said second path with the output signal



from said echo synthesizer means; said synthesizer means being responsive to an algebraically combined signal at an output of said combining means for providing an echo replica signal as the output signal of said synthesizer means;

said end delay analyzer further comprising:

first means for limiting current and delayed signal samples from said first path;

second means for limiting a signal from said second path; and

sequential comparator means for comparing the limited signals from said first and second limiting means to determine the delay location at which a maximum correlation, i.e., a match, is obtained.

4,587,383

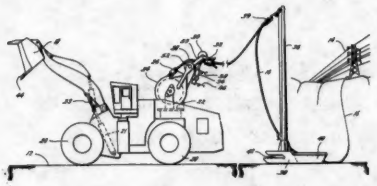
ELECTRICALLY POWERED MOBILE APPARATUS AND METHOD WITH SUSPENDED POWER CABLE

Erwin F. Stoldt, Longview, Tex., assignor to Marathon LeTourneau Company, Longview, Tex.

Continuation-in-part of Ser. No. 507,749, Jun. 27, 1983, abandoned. This application Apr. 27, 1984, Ser. No. 604,470

Int. Cl.[4] H02G *7/20, 7/02;* **B65H** *75/42;* **B66D** *1/395*

U.S. Cl. 191—12 R **24 Claims**



1. In a self-mobile electrically powered machine, the improvement comprising:

an elongated flexible cable supplying electrical power to said machine from a remote cable tower;

suspension means mounted on said machine for rotation about a vertical axis for suspending said cable from said machine, the point of suspersion of said cable from said suspension means being at a height greater than any other fixed portion of said machine, whereby said machine, while being supplied with electrical power through said cable, has 360° freedom of movement without fouling said cable suspended from said suspension means; and

engagement means on said machine adapted to engage and lift said remote cable tower for movement of said remote power source to a different operating location while said machine is still being supplied with power through said flexible cable.

24. The method for operating a self-mobile electrically powered machine comprising:

supplying electrical power to said machine by means of a flexible electrical cable extending between said machine and a remote source of electrical power;

suspending a portion of said cable between a rotatable means on said machine and a portable cable suspension means spaced from said machine at a first location;

operating said machine within a first area proximate said first location; and

utilizing said machine to move said portable cable suspension means to a second location, while said machine continues to be supplied with electrical power through said flexible electrical cable, when it is desired to operate said machine in a second area proximate said second location.

4,587,384

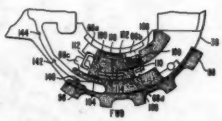
SUB-ASSEMBLY FOR ELECTRIC MOTOR INCLUDING REVERSING SWITCH

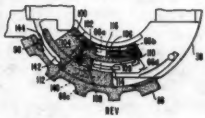
Michael S. Yacobi, Raleigh, N.C., assignor to Black & Decker, Inc., Newark, Del.

Filed Jul. 12, 1984, Ser. No. 630,247

Int. Cl.[4] H01H *9/00, 27/00*

U.S. Cl. 200—1 V **23 Claims**





1. A switch for controlling energization of an electric device by a power source, comprising:

a first member provided with first, second, third and fourth fixed contacts;

a second member coupled to said first member so as to form a chamber therebetween, said fixed contacts being located within said chamber;

an actuator at least partially enclosed within said chamber and movable therein, said actuator having a plurality of cam surfaces located within said chamber;

a plurality of bridging contacts provided in said second member and disposed within said chamber, each of said bridging contacts being arranged for engagement with selected ones of said fixed contacts; and

biasing means for urging said bridging contacts into engagement with said selected ones of fixed contacts,

said cam surfaces of said actuator being interposed between said bridging contacts and said fixed contacts such that

movement of said actuator selectively interrupts engagement of said briding contacts with said fixed contacts, thereby controlling the flow of power through the switch, said actuator being movable to a first position in which said first and second fixed contacts are electrically connected together; and said third and fourth contacts are electrically connected together; a second position in which no more that one pair of said fixed contacts are electrically connected together, and a third position in which said first and third fixed contacts are electrically connected together, and said second and fourth contacts are electrically connected together.

4,587,385

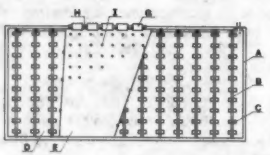
TOUCH PAD INDICATING ARRIVAL DURING SWIMMING CONTEST

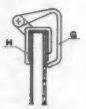
Augusto Capecchi, Via Byron 16, Genoa, Italy

Continuation-in-part of Ser. No. 165,742, Jul. 3, 1980, Pat. No. 4,476,358, which is a continuation of Ser. No. 341, Jan. 2, 1979, abandoned. This application Jul. 18, 1984, Ser. No. 632,610

Int. Cl.⁴ H01H *3/02, 35/00;* **A63K** *3/00*

U.S. Cl. 200—52 R **2 Claims**





1. A touch pad for swimming pool competitions, to be mounted partially submerged on the finishing wall of a swimming pool consisting of:

a metal back plate to be mounted adjacent said pool finishing wall, a resilient plastic perforated front striker plate located in front of said metal back plate, free flow of water being allowed through said front striker plate, and between said front striker plate and said metal back plate,

a frame attached to said back plate for loosely mounting said front striker plate to allow movement of said front striker plate toward said metal back plate when touched by a swimmer,

a plurality of parallel conductive strips mounted onto said metal back plate but electrically insulated by sheath means from said metal back plate, said conductive strips being electrically connected to each other,

a plurality of conductive contact springs welded onto said conductive strips, shaped as seagull wings to act as resilient spacers between said front striker plate and said metal back plate and to act as self cleaning electrical contacts between said conductive strips and said metal back plate.

4,587,386

SNAP-ACTING SWITCH

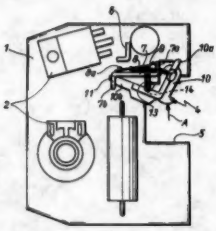
Fritz Prestel, Hausen a. Tann, Fed. Rep. of Germany, assignor to BSG-Schalttechnik GmbH & Co. K.G., Balingen, Fed. Rep. of Germany

Filed Jun. 11, 1984, Ser. No. 619,636

Int. Cl.⁴ H01H *3/16*

U.S. Cl. 200—61.58 R **7 Claims**

1. A snap switch attached to a mounting slot with a movable contact arm comprising at least one contact piece, at least one stationary opposite contact piece arranged within a moving range of said contact arm, a spring generating a preload and an actuating element subjected to an externally applied switching action, said actuating element causing the contact arm at least indirectly to perform switching motions, holding means directly attached to said mounting plate and carrying the mov-



able piece thereon, characterized in that said actuating element is mounted at that point on the holding means against which said contact arm rests in its neutral position, at least one projection on said actuating element, and clamping means for clamping said actuating element against a rear side of said mounting plate.

4,587,387

ELECTRIC SWITCH WITH PREBIASED CONTACT SPRING

Paul Piguet, La Chaux-de-Fonds, Switzerland, assignor to Transicoil, Inc., Worcester, Pa.

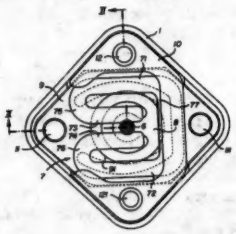
PCT No. PCT/CH83/00089, § 371 Date Mar. 7, 1984, § 102(e) Date Mar. 7, 1984, PCT Pub. No. WO84/00442, PCT Pub. Date Feb. 2, 1984

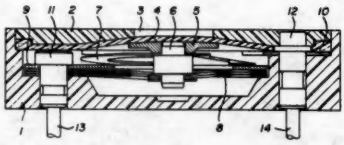
PCT Filed Jul. 8, 1983, Ser. No. 598,272

Claims priority, application Switzerland, Jul. 9, 1982, 4194/82

Int. Cl.⁴ H01H *5/18*

U.S. Cl. 200—67 D **4 Claims**





1. An electric switch comprising:

a biased contact spring, said spring having

lamellar outer branches and

two lamellar inner branches rranged between said outer branches, one of the ends of each of the inner branches being connected by means of a curved part to one end of the near outer branch, the two other ends of the outer

branches being connected to each other by means of a transverse connecting part, said connecting part being movable between a first and a second position;

a biasing member, the free ends of the inner branches being connected to that biasing member arranged for spreading apart said free ends from their unstressed position;

an actuating member, the biasing member being arranged in fixed relationship with said actuating member; and

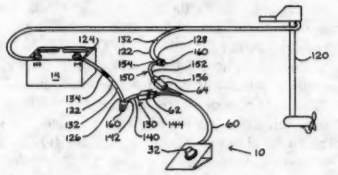
two fixed stops, one being situated at said first position and one being situated at said second position, the biased contact spring being movable between said positions and cooperating with said two fixed stops such that each of the two fixed stops has a plane contact surface extending at least over the length of the transverse connecting part of the biased contact spring.

4,587,388

REMOTE SWITCHING DEVICE FOR ELECTRIC TROLLING MOTOR

Eugene F. Cavin, 1000 4th St., Harvard, Ill. 60033

Filed Aug. 20, 1984, Ser. No. 642,414
Int. Cl.[4] H01H *21/26*
U.S. Cl. 200—86.5 **13 Claims**



1. A switch mechanism for operating an electric trolling motor for use on a boat in trolling for fish, wherein said switch mechanism includes:

a. a housing for said switch mechanism, said housing being made of a rustproof material;

b. a foot-operated switch assembly secured within said housing and including a switch connector, said foot-operated switch assembly being activated when pressed and deactivated when released;

c. a substantial length of conductor being connected at a first conductor end thereof to said foot-operated switch in electrical cooperation therewith;

d. a second conductor end of said conductor being oppositely disposed from said first conductor end thereof;

e. a securing means for removably securing said second conductor end in electrical cooperation with said electric trolling motor;

f. said conductor including a first wire and a second wire within said conductor;

g. a wire clip electrically secured on each of a first end of said first wire and a first end of said second wire, said wire clip serving to electrically connect said first wire and said second wire to said switch connector;

h. said first end of said first wire and said first end of said second wire forming said first conductor end;

i. said second end of said first wire and said second end of said second wire forming said second conductor end;

j. said securing means including a switch male connector and a switch female connector;

k. said switch male connector being electrically connected to said first wire at a second end of said first wire; said second end of said first wire being oppositely disposed from said first end of said first wire; and

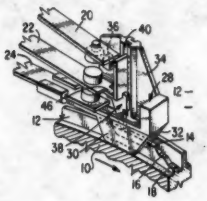
l. said switch female connector being electrically connected to said second wire at a second end of said second wire; said second end of said second wire being oppositely disposed from said second end of said second wire.

4,587,389

SNAP ACTION TIMER SWITCH ASSEMBLY

John Willigman, Elk Grove Village, Ill., assignor to Controls Company of America, Schiller Park, Ill.

Filed Dec. 7, 1984, Ser. No. 679,349
Int. Cl.[4] H01H *19/56, 43/10*
U.S. Cl. 200—153 LB **6 Claims**



1. A switch assembly for use with a timer having a program member including a moving cam track, said switch assembly comprising:

at least two blades, each having a free end with a respective switch contact thereon and self-spring biased toward the program member;

a first follower on the free end of a first of said blades engaging the program member to reference the first blade relative to the program member;

a cam follower engaging said cam track and actuating the free end of the second of said blades relative to said first blade; and

guide means on said first follower arranged to selectively frictionally engage said cam follower for guiding said cam follower with respect to said first follower for movement along a path substantially perpendicular to said cam track when substantially no lateral force is exerted on said cam follower and a consequent low friction force exists between said first follower and said cam follower and for constraining said first follower and said cam follower to move together when a lateral force above a predetermined threshold is exerted on said cam follower to generate a frictional force between said first follower and said cam follower which is greater than the self-spring bias force of said first blade.

4,587,390

VACUUM CIRCUIT BREAKER

Keith I. Gray, Napa, Calif., assignor to Golden Gate Switchboard Co., Napa, Calif.

Filed Jan. 7, 1985, Ser. No. 689,328
Int. Cl.[4] H01H *33/66, 33/42*
U.S. Cl. 200—153 SC **18 Claims**

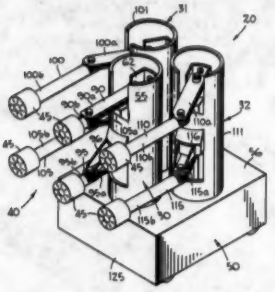
1. A circuit breaker with a panel for a multiple phase electrical system comprising:

(a) an interrupter for each phase of the electrical system, each of said interrupters comprising a housing, means for releasably securing at least one of said housings to said panel, a fixed circuit breaker contact disposed in said housing, and a movable circuit breaker contact disposed in said housing, at least one of said housings being adjustably rotatable relative to said panel when released from securement to said panel;

(b) a rigid fixed connecting link attached to each of said housings for rotation with its associated housing and connected to the fixed contact within its associated housing for establishing an electrical connection therewith, said fixed connecting links being spaced apart; and

(c) a rigid movable connecting link attached to each of said housings for rotation with its associated housing and connected to the movable contact within its associated housing for establishing an electrical connection therewith, said movable connecting links being spaced apart,

(d) at least one of said rotatable housings, when released from securement to said panel, being adjustably rotatable



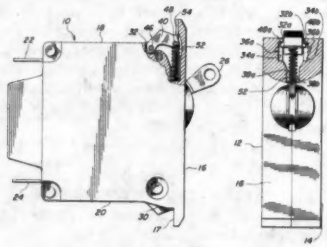
for selecting the extent of spacing between fixed connecting links and for selecting the extent of spacing between movable connecting links.

4,587,391

SNAP IN PANEL MOUNTED CIRCUIT BREAKER

George S. Harper, Cambridge, Md., assignor to Airpax Corporation, Cambridge, Md.

Filed Jun. 25, 1984, Ser. No. 624,296
Int. Cl.[4] H01H 9/08
U.S. Cl. 200—296 22 Claims



10. A snap-in panel mount circuit breaker mountable in an opening in a panel, comprising:

a case composed of first and second case halves, each having cooperating openings and first and second sets of recesses formed therein, said case including means for preventing passage of said breaker completely through said opening in said panel;

locking dog means including a rigid member having a cammed outer surface, and said rigid member further comprising first and second sets of lugs which mate with and seat in said first and second sets of recesses, respectively, said first set of lugs and first set of recesses together defining a pivot mounting assembly about which said rigid member is pivotable, and said second set of lugs and second set of recesses together limiting outward rotational movement of said rigid member; and

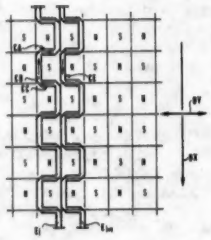
bias means contained in said case and engaging said locking dog means to normally urge said locking dog means outwardly.

4,587,392

ELECTRO-MAGNETIC INDUCTION SCROLLING DEVICE FOR HEATING FLAT PRODUCTS

Bernard Chaussé, Antony; Jean Delassus, Montmorency, and Claude Léon, Le Bourget, all of France, assignors to CEM - Compagnie Electro-Mecanique, Paris, France

Filed Jan. 17, 1985, Ser. No. 692,141
Claims priority, application France, Jan. 26, 1984, 84 01187
Int. Cl.[4] H05B 6/40
U.S. Cl. 219—10.71 5 Claims



1. Device for heating flat products, scrolling, through electro-magnetic induction, said device comprising:

a transfer system (R1, R2, R3, G1, G1) holding the flat product to be heated (7) in a heating plane and scrolling it along a longitudinal transverse direction (DX) in said plane, said product being arranged in width along a transverse direction (DY) also in said plane and having its thickness along a direction of flow (DZ), each of said three directions being perpendicular to the two others, the transverse position of the product to be heated being adjustable;

inductor excitation windings (E1, E1, Ei, Ei+1);

electric power sources (SE, Io, I1, I3, I4, I5) supplying said windings with an electric current periodically variable according to time and with amplitude control such that the alternating current in the inductors creates a magnetic alternating flux, the amplitude of which varies like the amplitude of said current;

and inductor magnetic circuits (BCi) channeling said magnetic flux and inductively heating the product to be heated along the direction of magnetic flux;

said windings and said magnetic circuits forming an inductor (IC) have a periodical spatial composition both along the longitudinal direction with a longitudinal pitch (PC) and along the transverse direction with a transverse pitch (PT), so that the variations in the amplitude in the magnetic flux causing heating in the heating plane outline a rectangular meshing consisting of a juxtaposition of rectangular squares of lengths equal to said longitudinal pitch and widths equal to said transverse pitch, and said magnetic circuits containing in each of said squares at least one central pole piece (P) such that the amplitude of the heating magnetic flux cancels out on the sides of the square so that the average heating obtained after scrolling of the product to be heated is the same in all the widths of a square comprised entirely in the width of said product, the form of said central pole piece being further such that said amplitude is maximum in the center of the square with distribution more or less in sinusoid arch form both in the longitudinal sections and the transverse sections, and the ratio of the transverse pitch to the longitudinal pitch being selected to cancel out the local heterogeneity of heating in each of the squares which are entirely contained in width (LA) of the product to be heated, said local heterogeneity (DT) being the divergence in one direction or the other from the temperature in the center of the width of the square as compared to that of the edges of the square after scrolling of said product, said local heterogeneity devel-

oping on output from an inductor when its real transverse pitch diverges from an equilibrium value similar to the longitudinal pitch of said inductor, and said heterogeneity increasing firstly with the divergence of said equilibrium value and secondly with the current supply in said inductor;

said device containing a first inductor (IL) and a second inductor (IC), said inductors succeeding each other longitudinally and having respectively a third (PL) and a second (PC) different values of the longitudinal pitch, and consequently a first and second equilibrium values of the transverse pitch;

each of said inductors consisting of the juxtaposition of several inductor sectors (BCi, Ei, BCi+1, EI+1) succeeding each other transversally and regularly according to said transverse pitch, each of said sections extending longitudinally and having its own inductor winding (Ei) and its own magnetic circuit (BCi) and having said frequency according to said longitudinal pitch (PC);

mechanical setting mechanisms (61, 51*a*, 31*a*) controlling the spacing between said inductor sections (B1, E1) and consequently said transverse pitch (PT) to the same value in said two inductors (IL, IC) so as to adapt the device to limited variations in the width of the product to be heated through a variation in said spacing making said width (LA) equal to an integer number of transverse pitches thus making the edges of said product coincide with the edges of two said squares in each inductor so as to heat the edge areas of said product to the same temperature as the intermediate areas, said common transverse pitch being controlled between said first and second equilibrium values of the transverse pitch;

an electrical setting mechanism (RE) controlling the ratio of the electrical currents supplying the two inductors so that, when a difference between the real transverse pitch and its equilibrium value in each inductor tends to produce a local heterogeneity of heating specific to said inductor and supplying the two inductors (IL, IC) with the electric current required to cancel out the local global heating heterogeneity of the device by compensating the two heterogeneities specific to the two inductors.

4,587,393

HEATING APPARATUS HAVING A SENSOR FOR TERMINATING OPERATION

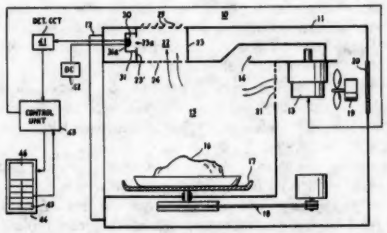
Shigeki Ueda, Kouriyama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 28, 1984, Ser. No. 687,271

Claims priority, application Japan, Jan. 5, 1984, 59-416; Mar. 12, 1984, 59-47418; Jun. 8, 1984, 59-118444

Int. Cl.[4] H05B *6/68*

U.S. Cl. 219—10.55 B **19 Claims**



1. A heating apparatus comprising:

a chamber in which a material to be heated is placed;

means for heating said material to cause it to emit a gaseous substance;

fan means for directing air into said chamber;

duct means connected to said chamber for exhausting the air directed into the chamber to outside of the chamber, the duct means having a sufficiently long airflow passage between an inlet and an outlet thereof so the air exhausted through it has substantially laminar flow therein, the duct means having an opening on a side wall positioned to be responsive to a diffusing portion of the laminar flow;

enclosure means, the opening being closed by said enclosure means, the opening and enclosure means being arranged so said substance diffuses from said duct means through said opening into the enclosure means,

sensor means in said enclosure means for detecting said diffusing substance; and

means responsive to said sensor means for de-energizing said heating means.

4,587,394

DEVICE AND METHOD OF WELDING NUCLEAR FUEL ASSEMBLY STRUCTURAL ELEMENTS

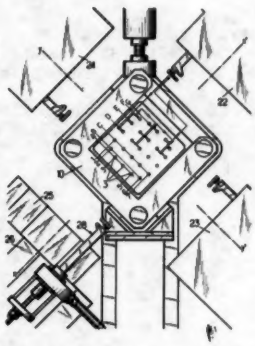
Bernard Vere, 2 les Chusets Brie et Angonne, 38320 Eybens, and Maura, Biryoukoff Alléd du Mathias, 69760 Limonest, both of France

Filed Sep. 16, 1983, Ser. No. 532,929

Claims priority, application France, Sep. 16, 1982, 82 15663

Int. Cl.[4] B23K *11/32*

U.S. Cl. 219—67 **11 Claims**



11. Method of welding a plurality of guide tubes of a nuclear fuel assembly to structural elements distributed along said guide tubes, said method comprising mounting the group of said guide tubes and structural elements, pre-assembled by a tooling, on a stand; moving a welding gun transversely to the direction of said guide tubes by holding said welding gun in an orientation in which it can pass between two adjacent ones of said guide tubes; tilting said gun about its direction of transverse movement to bring it into engagement on a particular one of said guide tubes at the location of a proposed weld; closing said gun and sending an electrical welding pulse therein; returning said gun its original orientation and recommencing the sequence on another one of said guide tubes.

4,587,395

BONDING LEADS TO SEMICONDUCTOR DEVICES

Peter J. Oakley; Norman R. Stockham, both of Cambridge, and Heidi M. Miller, Essex, all of England, assignors to The Welding Institute, Cambridge, England

Filed Dec. 6, 1983, Ser. No. 558,625

Claims priority, application United Kingdom, Dec. 6, 1982, 8234733

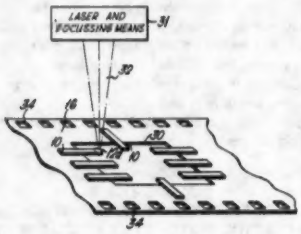
Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121 LD **12 Claims**

1. A method of forming bumps on the free ends of the conductive flat leads of a tape for use in the bumped-tape automated bonding process of connecting leads to a semi-conductor circuit device, the method including:

locating a focusing lens in the path of a beam from a laser;

relatively positioning the focused laser beam and each lead in succession so that the surface of the lead is substantially at the focus of the laser beam;



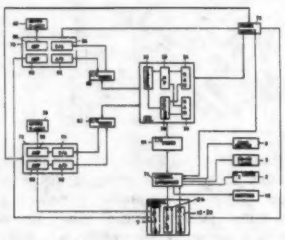
and subjecting each lead in turn to a single pulse of energy from the laser beam to melt the end of the lead so that surface tension forces form at the end of the lead a bump the width of which is not significantly larger than the width of the tape.

4,587,396

CONTROL APPARATUS PARTICULARLY USEFUL FOR CONTROLLING A LASER

Martin D. Rubin, Kfar Saba, Israel, assignor to Laser Industries Ltd., Tel Aviv, Israel

Filed Sep. 22, 1983, Ser. No. 534,718
Claims priority, application Israel, Dec. 31, 1982, 67599
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121 LU **31 Claims**



1. Control apparatus for controlling a laser beam with respect to an object to trace a desired pattern thereon, comprising:

a manipulatable tracing device for manually inputting a desired pattern and for producing electrical signals in accordance with the inputted pattern;

a memory for storing the inputted pattern;

display means for displaying the pattern;

and a control system for controlling the laser beam; said control system comprising:

(a) mode-selector means including a Manual-Mode selector;

(b) operation-selector means including a Set-Operation selector;

(c) and operation-control means including a control switch;

said Manual-Mode selector including means effective, when selected, to cause the apparatus to operate according to a Manual-Mode wherein the movement of the tracing device traces said pattern on the object;

said Set-Operation selector including means effective, when selected, to cause the apparatus to produce a Set Operation wherein the movement of the tracing device is stored in said memory and is exhibited by the display means;

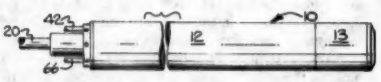
said control switch including means effective, when actuated, to control the energization of the laser beam in accordance with said pattern traced on the object during said Manual Mode of Operation, and stored in said memory during said Set Operation.

4,587,397

PLASMA ARC TORCH

Salvador L. Camacho, and David P. Camacho, both of Raleigh, N.C., assignors to Plasma Energy Corporation, Raleigh, N.C.

Continuation-in-part of Ser. No. 557,217, Dec. 2, 1983, which is a continuation-in-part of Ser. No. 460,062, Jan. 21, 1983. This application Nov. 9, 1984, Ser. No. 670,399
Int. Cl.[4] B23K *7/00*
U.S. Cl. 219—121 PM **12 Claims**



1. A plasma arc torch adapted to operate in the nontransfer arc mode and which is characterized by long electrode life, and comprising

a torch housing,

a rear electrode mounted within said housing and comprising a tubular metal member having a closed inner end and an open outer end,

a front electrode comprising a tubular metal member having a bore therethrough, said front electrode being mounted within said housing and in coaxial alignment with said rear electrode and having an inner end adjacent said open outer end of said rear electrode and an opposite outer end, and with said bore including an inner cylindrical end portion and an outer end portion which is cup-shaped in cross section to define an outwardly facing radial shoulder, and with said inner cylindrical end portion having a substantial axial length,

a tubular sleeve member mounted to said housing and coaxially surrounding said front electrode in a spaced apart arrangement so as to define an annular passageway between said front electrode and said sleeve which extends along substantially the entire axial length of said front electrode,

coolant flow path means extending through said housing and communicating with said annular passageway, and such that a fluid coolant may be circulated through said annular passageway to remove heat from said front electrode during operation of the torch,

vortex generating means for generating a vortical flow of a gas at a location intermediate said rear and outer electrodes and which is in coaxial alignment with said rear and front electrodes,

power supply means operatively connected to said rear and front electrodes for generating an arc which is adapted to extend axially from said rear electrode through said vortical flow of gas and to an attachment located on said bore of said front electrode, and

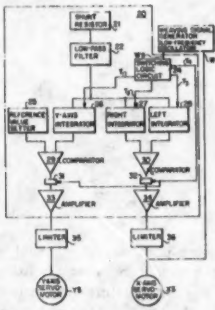
means for coordinating said vortex generating means and said power supply means such that the arc attaches on said radial shoulder of said front electrode, and whereby the attachment of the arc to the radial shoulder results in erosion of the material of the front electrode along an axial path of travel rather than radially through the electrode, to thereby extend the life of the front electrode.

4,587,398

WELD LINE SYSTEM AND METHOD FOR CONTROL

Shinichi Sarugaku, Narashino, and Masao Tsuji, Funabashi, both of Japan, assignors to Hitachi Ltd., Tokyo and Hitachi Keiyo Engineering Co., Ltd., Chiba, both of, Japan

Filed Aug. 24, 1984, Ser. No. 643,707
Claims priority, application Japan, Aug. 26, 1983, 58-154874
Int. Cl.[4] B23K 9/12
U.S. Cl. 219—124.22 22 Claims



1. A system for controlling weld line profile, comprising:

means for controlling the relative movement of apparatus for guiding an electrical arc torch for welding to follow a welding line;

correction means for storing a reference quantity, for detecting an electrical quantity corresponding to the state of the arc of said torch, and for providing a predetermined correction signal to said controlling means in accordance with deviations between said detected quantity and said reference quantity; and

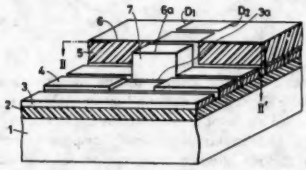
means responsive to said correction means for limiting the value of said correction signal to a quantity smaller than a predetermined quantity corresponding to said deviations when said deviations exceed a predetermined value corresponding to the value of an electrical characteristic of said arc during a breakdown state of said arc.

4,587,399

THERMAL HEAD

Kazuya Higeta; Kazumasa Fujioka; Takeo Nemoto; Takahiro Daikoku, and Isao Nakajima, all of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 19, 1984, Ser. No. 683,499
Claims priority, application Japan, Dec. 26, 1983, 58-243981
Int. Cl.[4] B47J 3/20; G01D 15/10
U.S. Cl. 219—216 18 Claims



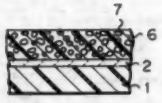
1. In a thermal head having a substrate, a heat accumulating member which is disposed on the substrate, a plurality of heating resistors which are juxtaposed on the heat accumulating member in a manner to be spaced from each other, a plurality of electrodes which supply electric power to the heating resistors, and a protective member which prevents oxidation and wear of the heating resistors and the electrodes; the thermal head being characterized in that said protective member comprises printing dot portions which are formed independently of each other above the respective heating resistors without a finite contacting area therebetween, which printing dot portions are made of thermally conductive members higher in thermal conductivity than the other part of said protective member, the surfaces of said thermally conductive members being even with a head surface formed by the portion of the protective member other than said printing dot portions.

4,587,400

THERMAL HEAD

Takashi Kanamori; Susumu Shibata; Hideo Sawai, and Kenji Kuroki, all of Tokyo, Japan, assignors to OKI Electric Industry Co., Inc., Tokyo, Japan

Filed Jun. 22, 1984, Ser. No. 623,311
Claims priority, application Japan, Jul. 5, 1983, 58-121086
Int. Cl.[4] B41J 3/20; G01D 15/10
U.S. Cl. 219—216 3 Claims



1. A thermal head comprising a substrate, a heater layer and a conductive lead layer attached on the substrate, and a protection layer covering said heater layer

CHARACTERIZED IN THAT

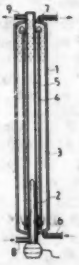
said protection layer is polyimide resin including a hard filler of particles, said filler being one selected from S_iC, Al_2O_3, $S_{i3}N_4$, S_iO_2, and $T_{a2}O_5$, and weight ratio of the filler to the polyimide resin being in a range between 1.1 and 3.2.

4,587,401

ELECTRIC WATER HEATING APPLIANCE

Heinz Ekman, Pippuru, 02400 Kirkkonummi, Finland

Filed Mar. 18, 1985, Ser. No. 713,573
Claims priority, application Finland, Mar. 27, 1984, 841224
Int. Cl.[4] H05B 3/82; F24H 1/20
U.S. Cl. 219—314 1 Claim



1. A heating appliance for heating a reservoir of water for household use, comprising:

a first cylindrical tank having a vertically disposed longitudinal axis, said first tank containing said reservoir of water for household use and including inlet means at a lower end thereof and outlet means at an upper end thereof;

a second cylindrical tank having a diameter substantially smaller than the diameter of said first tank and containing a second reservoir of water, said second tank having a vertically extending longitudinal axis and extending concentrically through said first tank, said second tank having

outlet means at its upper end and inlet means at its lower end for circulating the water through said second reservoir, the water in said second reservoir being maintained entirely separate from the water in said first tank reservoir by the wall of said second tank;

heating means, disposed within the lower portion of said second tank and being immersed in said second reservoir, for heating the water in said second tank; and

an elongated tube extending concentrically about said second tank from a lower portion of said first tank to an upper portion of said first tank, said tube having a closed bottom end secured about a lower portion of said second tank and an open top end, said tube and said second tank defining therebetween a third reservoir of significantly smaller diameter than the diameter of said first tank, whereby the water in said third reservoir is quickly heated by the heated water in said second tank, said tube having circumferential openings disposed adjacent said bottom end for admitting cooler water from said first tank whereby said admitted cooler water may be heated in said third reservoir.

4,587,402

PLANAR HEATING UNIT

Atsushi Nishino, Neyagawa; Masaki Ikeda, Hirakata; Yoshihiro Watanabe, Moriguchi, and Tadashi Suzuki, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

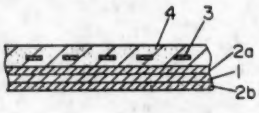
PCT No. PCT/JP83/00203, § 371 Date Feb. 22, 1984, § 102(e) Date Feb. 22, 1984, PCT Pub. No. WO84/00275, PCT Pub. Date Jan. 19, 1984

PCT Filed Jun. 23, 1983, Ser. No. 588,877

Claims priority, application Japan, Jun. 24, 1982, 57-109419; Oct. 29, 1982, 57-191649; Jan. 18, 1983, 58-6311

Int. Cl.⁴ F24H *9/00*

U.S. Cl. 219—343 **10 Claims**



1. A planar heating unit comprising a heat resistant metal base coated with an insulating enamel layer on at least one surface of said base, an exposed covering enamel layer fixed on said insulating enamel layer, and, as a heating conductor, a metal strip having a thickness of not more than 120 μm covered by said covering enamel layer, said metal strip being spaced apart from said insulating enamel layer.

4,587,403

THERMOSTAT SETBACK CONTROLLER SUB-BASE

Robert P. Shapess, Cato, N.Y., assignor to Snyder General Corporation, Red Bud, Ill.

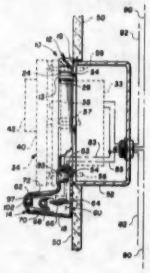
Filed Apr. 25, 1983, Ser. No. 488,102

Int. Cl.⁴ H01H *37/14*; H04Q *7/00*

U.S. Cl. 219—366 **7 Claims**

1. A sub-base for use with a thermostat for an air conditioning system, said thermostat including a thermostat housing adapted to be mounted on structure such as an electrical conductor junction box, and a temperature responsive switch disposed in said thermostat housing, said thermostat housing being adapted to permit circulation of air therethrough and over sensing means for said temperature responsive switch, said sub-base comprising:

a member including a plate portion constructed so as to mounted between a thermostat housing and a structure and to provide for mounting said thermostat housing on said structure without modification of said thermostat housing or said structure, a sub-base housing portion projecting from said plate portion in proximity to said thermostat housing and directly below said thermostat housing, electrical heating element means in said sub-base housing portion, and means forming openings in said sub-base housing portion for conducting air through said



sub-base housing portion and oversaid heating element means and then to said thermostat housing to give a false heat signal to a temperature responsive switch of the thermostat to setback the temperature at which an air conditioning system is operated by said thermostat.

4,587,404

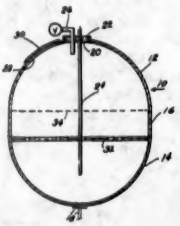
ELECTRICAL THERMAL STORAGE HEAT SINK FOR SPACE HEATER

Marvin M. Smith, 1010 E. Parkway Dr., Muncie, Ind. 47304

Filed Feb. 6, 1984, Ser. No. 576,633

Int. Cl.⁴ F24H *7/00*

U.S. Cl. 219—378 **6 Claims**



1. An electro thermal storage means comprising a mass of hard, normally electrically nonconductive material enclosed in a hollow vessel made of a noncorrosive, electrically conductive material and having a vertically disposed electrode extending into and insulated from the said vessel, said mass filling the lower portion of said vessel and the said electrode penetrating said mass, a layer of electrically conductive material disposed on top of and engaging the material of said mass and extending from the electrode to the wall of said vessel, individual external electrical connection means on said electrode and on a conductive portion of said vessel, and an electric power supply connected in circuit with the connection means of said electrode and said vessel through the said conductive material sufficient to heat and melt the said mass of material.

4,587,405

DEVICE TO CONTROL THE COOKING PROCESS IN A STEAM PRESSURE COOKER

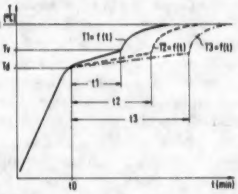
Wolfram K. Andre, Aichwald, Fed. Rep. of Germany, assignor to Kurt Wolf & Co. KG, Fed. Rep. of Germany

Filed Apr. 23, 1984, Ser. No. 602,811

Claims priority, application Fed. Rep. of Germany, May 7, 1983, 3316799

Int. Cl.[4] H05B 1/02

U.S. Cl. 219—491 10 Claims



1. A device to regulate the cooking process in a steam pressure cooker enclosing water and food to be cooked and heated by a heating element controlled by a control means comprising a temperature sensor means (TF) measuring the temperature of said pressure cooker and transmitting a signal to signal means (TE), said signal means (TE) transmitting a control signal corresponding to the temperature measured to a time measuring means (ZM), a timer means (ZG) and a control circuit means (ST) controlling heating element (HE); said time measuring means (ZM) activating when it receives a control signal corresponding to the vapor phase temperature (Td) of said water and deactivating when it receives a control signal corresponding to the evaporation temperature (Tv) of said water to measure the time interval (t1) elapsing between reaching said vapor phase temperature (Td) and said evaporation temperature (Tv), and said time measuring means (ZM) transmitting a signal corresponding to said time interval (t1) to said timer means (ZG); said timer means (ZG) preset to measure a preselected cooking time (tg) activating when it receives a control signal from signal means (TE) corresponding to a preselected measuring temperature (Tm) between said evaporation temperature (Tv) and a preselected cooking temperature (Tk) to measure said preselected cooking time (tg) shortened by an interval of time (Δt1) proportional to said measured time (t1), and said timer means (ZG) deactivating said control circuit means (ST) for said heating element (HE) when a shortened cooking time (tg-Δt1) has elapsed; said signal means activating and deactivating control circuit means (ST) during said shortened cooking time (tg-Δt1) to maintain said cooking temperature (Tk).

4,587,406

APPARATUS FOR CONTROLLING THE COOKING PROCESS IN A COOKING VESSEL

Wolfram K. Andre, Aichwald, Fed. Rep. of Germany, assignor to Kurt Wolf & Co. KG, Fed. Rep. of Germany

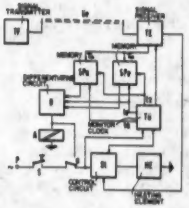
Filed Jan. 29, 1985, Ser. No. 695,970

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1984, 3405731

Int. Cl.[4] H05B 1/02

U.S. Cl. 219—497 14 Claims

1. Apparatus for controlling an electric heating element (HE) for a cooking vessel, comprising: a signal transmitter means (TF) responsive to a temperature sensor means on said cooking vessel measuring the temperature in said cooking vessel; a signal receiver means (TE) in communication with said signal transmitter means (TF); a control circuit means (St) capable of controlling the heat output of said heating element (HE), said control circuit means (St) being capable of monitoring said heating element (HE) during successive monitoring cycles when a first switch means (S) is activated and determining at the beginning of each said monitoring cycle whether said heating element (HE) has been specified to full capacity heat output said control circuit means monitoring said successive monitoring cycles both when said full capacity heat output is and is not specified; a temperature differential circuit means (D) activated by said control circuit means (St) when said full capacity heat output is specified to determine a temperature differential during each said monitoring cycle when said full capacity heat output is specified whereby a first temperature value (Ta) measured by said temperature sensor means at the



beginning of each said monitoring cycle is stored in a memory means (SPa) and a second temperature value (Te) measured by said temperature sensor means at the end of each said monitoring cycle is stored in a memory means (SPe) and said first and second temperature values (Ta) and (Te) are compared; and a second switch means (A) activated by said temperature differential means deactivating said heating element when said first and second temperature values (Ta) and (Te) are the same and when said second temperature value (Te) is less than said first temperature value (Ta).

4,587,407

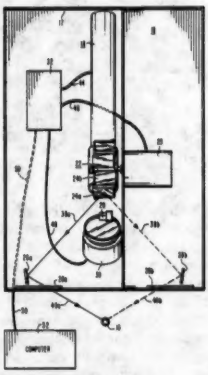
SCANNING SYSTEM FOR BAR CODE LABELS AFFIXED TO RODS

Hassan J. Ahmed, and James L. Fogg, both of Columbia, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 20, 1983, Ser. No. 505,670

Int. Cl.[4] G06K 7/10

U.S. Cl. 235—467 10 Claims



1. A system for identifying a bar code label affixed to an elongated rod, wherein each of the bars of said bar code label generally circumferentially wraps around said rod to generally lie in a separate plane generally perpendicular to the longitudinal axis of said rod and wherein the bar code portion of said bar code label generally circumferentially spans an angle about said longitudinal axis, with said bar code angle being greater than 180° and less than 360°, said system comprising:

(a) a bar code reading optical scanner with a light beam from a single source, said scanner having means for deflecting said beam to produce two diverging scanning lines, said scanner also having means for reflecting said two diverging scanning lines to converge and to generally colinearly and superimposingly intersect, defining a general line of intersection, with said two converging scanning lines intersecting at an angle greater than 360° minus said bar code angle and up to 180°, and said line of intersection having a length greater than the width of said bar code portion of said bar code label, and

(b) means for disposing said rod to align said longitudinal axis generally colinear with and generally parallel to said intersection line, to axially position said bar code portion of said bar code label within the axial position of said intersection line, and to transversely position said longitudinal axis sufficiently close to said intersection line for said converging scanning lines to intercept the surface of said rod along intercepting scanning lines, with said intercepting scanning lines subtending an angle about said longitudinal axis greater than 360° minus said bar code angle and up to 180°, for said scanner to identify said bar code label independent of the rotational position of said rod about its said longitudinal axis.

4,587,408

AUTOMATIC DEPOSITING/DISPENSING APPARATUS

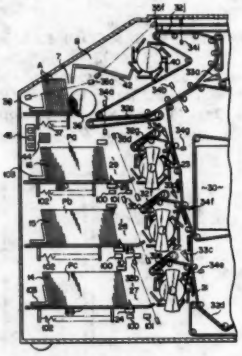
Yoshihiro Watanabe, Fujisawa, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 8, 1983, Ser. No. 502,119

Claims priority, application Japan, Jun. 16, 1982, 59-89701[U]

Int. Cl.⁴ G06F *15/30*

U.S. Cl. 235—379 **3 Claims**



1. An automatic depositing/dispensing apparatus which stores deposited notes together with previously stored notes and appropriates the deposited notes for dispensation, said apparatus comprising;

a housing having a note inlet and a note outlet;

a plurality of storage means provided in the housing each for storing deposited notes of a denomination and including first note storage means for storing notes of a denomination available for dispensation and second note storage means for storing notes of a denomination unavailable for dispensation;

first conveyor means for transferring notes inserted in the note inlet to the individual note storage means;

second conveyor means for transferring, to the note outlet, notes taken out of the individual note storage means, said second conveyor means sharing a common path with the first conveyor means;

judgment means provided in the common path for (i) detecting at least the denomination for deposited notes passing through the common path to determine whether the denomination of the deposited note is available or unavailable for dispensation, (ii) detecting whether the deposited note is fit or unfit for reuse, and (iii) detecting at least the denomination and authenticity for notes passing through the common path to be dispensed; and

diverging means operatively connected to said judgment means and positioned so as to correspond to both said first and second note storage means for leading notes transferred thereto by the first conveyor means to said first and second note storage means in accordance with detection results of said judgment means so as to segregate said deposited notes into notes available for dispensation and notes unavailable for dispensation, respectively,

said diverging means for leading a deposited noted to said first storage means which is detectcd as being available for dispensation in response to said judgment means determining that the denomination of said deposited note is available for dispensation and that the deposited note is fit for reuse,

said diverging means for leading a deposited note to said second note storage means which is detected as being unavailable for dispensation in response to said judgment means determining that the denomination of said deposited note is unavailable for dispensation and/or that the deposited note is unfit for reuse.

4,587,409

INFORMATION PROCESSING DEVICE

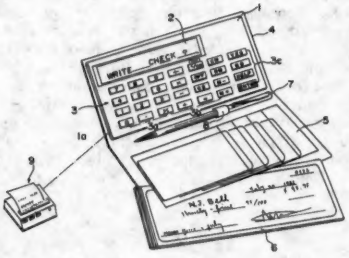
Kosuke Nishimura, and Yoshiro Kataoka, both of Yamatokoriyama, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 25, 1983, Ser. No. 555,184

Claims priority, application Japan, Nov. 30, 1982, 57-211704; Nov. 30, 1982, 57-211705; Mar. 23, 1983, 58-49148

Int. Cl.⁴ G06F *5/00*

U.S. Cl. 235—380 **2 Claims**



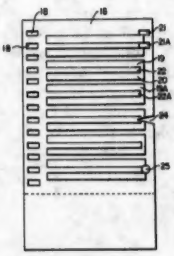
1. An electronic book-keeping device utilizeable in association with credit cards for the individual control of the cumulative amounts of the respective charges incurred by the use of the credit cards, which device comprises an input keyboard having a plurality of input keys for the entry of the amount of money payable for the purchase done by the use of each of the credit cards, a display unit disposed adjacent the input keys for displaying input data and results of calculations, a storage means for storing charges one for each of the credit cards, means for updating, each time the amount of the money is entered, the charge associated with one of the cards used, means for causing the display unit to display all of the symbols signifying the respective credit cards before one of the cards is selected, and means for selecting one of the cards when one of the input keys which is located adjacent one of the displayed symbols associated with said one of the cards has been depressed.

4,587,410

CAPACITIVE CARD AND READER PARKING SYSTEM

Arthur G. Milnes, 1417 Iverness Ave., Pittsburgh, Pa. 15217

Filed Apr. 9, 1984, Ser. No. 598,472
Int. Cl.[4] G06K 5/00
U.S. Cl. 235—382 17 Claims



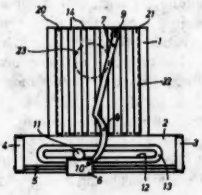
1. An automatic system for dispensing services controlled by cards carrying successively positioned individual capacitances of a predetermined value comprising a card reader including a frequency generator, capacitance sensing means driven by said frequency generator, means coupling said capacitance sensing means successively to said successively positioned individual capacitances carried by said card, means driven by said capacitance sensing means for triggering service dispensing means adapted to dispense a predetermined quantum of services in response to a capacitance of said predetermined value sensed by said capacitance sensing means, and means triggered by said capacitance sensing means for altering the magnitude of said sensed individual capacitance to a value other than said predetermined value to prevent reuse of said capacitance in said card reader.

4,587,411

METHOD OF PRINTING, EVALUATING AND CHECKING THE PRINTING IMAGE OF A PRINTER AND APPARATUS FOR CARRYING OUT SAID PROCESS

Günther Obstfelder, Weinheim-Lützelsachsen; Gerhard Kreutze, Neckarsteinach, and Winfried Lüttig, Heiligkreuzsteinach, all of Fed. Rep. of Germany, assignors to F & O Electronic Systems GmbH & Co., Neckarsteinach, Fed. Rep. of Germany

Filed Jan. 4, 1984, Ser. No. 568,091
Claims priority, application Fed. Rep. of Germany, Jan. 4, 1983, 3300081
Int. Cl.[4] G06K 5/00
U.S. Cl. 235—437 33 Claims



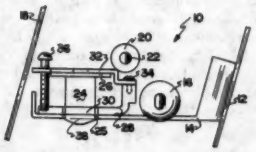
1. A method for printing and checking a printing image of an electrically-operated thermoprinter comprising the steps of:
(a) inputting into the printer data to be printed;
(b) transporting through the printer a web of paper to be printed;
(c) printing the printing image on the paper wherein the printing image has a plurality of print lines and print characters for each print line are generated line by line;
(d) after printing of the first print line and prior to finishing printing of the printing image, scanning and sensing the just-printed portion of the printing image;
(e) comparing the sensed just-printed portion of the printing image with the input data; and
(f) upon detection of an error from the comparing step and prior to finishing printing of the printing image, rendering the printing image as unusable by the printer marking the printing image visually as a false print.

4,587,412

MAGNETIC SENSOR FOR TRAY ACCEPTOR

Yair Apisdorf, Mayfield Hts., Ohio, assignor to Ardac, Inc., Eastlake, Ohio

Filed Feb. 27, 1984, Ser. No. 584,097
Int. Cl.[4] G06K 7/08
U.S. Cl. 235—449 9 Claims



1. A tray acceptor for receiving and determining the autenticity of currency, comprising:
a plate in juxtaposition to a path traveled by the currency maintained in a tray;
a magnetic reading head;
means connected to said plate for receiving said magnetic reading head and positionally maintaining it with respect to said path;
circuit means connected to said magnetic reading head for detecting the presence of magnetic characteristics on the currency; and
wherein said means for receiving said magnetic reading head comprises a base spring portion connected to said plate and having an opening therein for receiving said head, and a top mounting bracket connected at a first end thereof to a first end of said base spring portion, and in adjustable communication with said base spring portion at a second end thereof, said magnetic reading head being maintained between said base spring portion and said top mounting bracket.

4,587,413

IC-MODULE IDENTIFICATION CARD

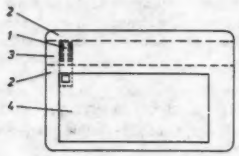
Joachim Hoppe, and Yahya Haghiri-Tehrani, both of Munich, Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Fed. Rep. of Germany

Continuation of Ser. No. 637,683, Aug. 2, 1984, Pat. No. 4,550,248, which is a continuation of Ser. No. 356,800, Mar. 10, 1982, abandoned. This application Sep. 6, 1985, Ser. No. 773,417
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1981, 3111516; Mar. 24, 1981, 8108609[U]
Int. Cl.[4] G06K 19/06
U.S. Cl. 235—492 12 Claims

1. A standardized data card providing accessible electrically encoded data, said card comprising:
a rectangular card member of standardized length and width, said card member comprising a stratum of generally predetermined thickness, said card having at least a first elongated zone lying generally parallel to the length of said rectangular card member, said zone being reserved for embossed indicia protruding above one side of said

card to increase the overall thickness of the data card in excess of the thickness of said stratum, and

a carrier element applied to said card member, said carrier element being elongated and having first and second sections displaced in the direction of elongation of said element, said first section comprising an IC module containing the electrically encoded data, said second section



being flexible and thin with respect to said predetermined thickness of said card, said second section containing contact areas connected to said IC module by which the data in said module may be accessed, said first section of said carrier element being completely located in said first zone of said card member, said second section being so arranged in said card member that said contact areas are located completely outside said zone.

4,587,414

APPARATUS FOR ADJUSTING THE POSITION OF AN EDGE WITH SURFACE PORTIONS REFLECTING DIFFERENT WAVELENGTHS OF LIGHT

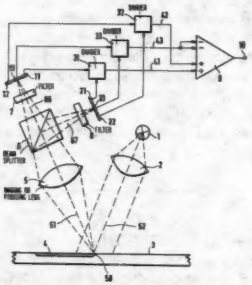
Peter Bohlander, Dusseldorf, Fed. Rep. of Germany, assignor to Betriebsforschungsinstitut VDEh Institut fur angewandte Forschung GmbH, Dusseldorf, Fed. Rep. of Germany

Filed Jun. 9, 1983, Ser. No. 502,706

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1982, 3222629

Int. Cl.⁴ G05B *1/00*

U.S. Cl. 250—202 **6 Claims**



1. Apparatus for adjusting the position of an edge between two surface portions having different spectral reflectivities, both of said surface portions extending in the plane of a longitudinally movable belt which is also transversely movable in the plane of its surface relative to the direction of its longitudinal movement, said apparatus comprising:

an illuminating lamp mounted to be directed at those parts of said surface portions adjacent to the edge between them;

a focussing optic for receiving light reflected from the parts of said surface portions illuminated by said illuminating lamp;

a beam splitter for splitting the beam passing through said focussing optic;

a pair of filters through which the pair of beams formed by said beam splitter respectively pass, each of said filters being arranged to block light transmission in a range of wavelengths in which the other filter is transmissive to produce two wavelength ranges;

a photodiode receiver associated with each filter and on which an image of said edge between said two surface portions will fall in operation of the apparatus;

a device for effecting transverse movement of the belt;

means for forming the quotient of the voltages generated in use by the beams falling on said photodiodes; and

means using said quotient voltages for controlling said device to effect transverse movement of the belt in order to move the latter by a required distance in the required direction when the reflected light is not of precisely predetermined relative intensities in the two wavelength ranges which pass through said filters.

4,587,415

PHOTO-DETECTING DEVICE WITH STORAGE TIME CONTROL

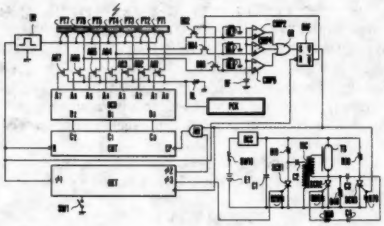
Tokuichi Tsunekawa; Shinji Sakai, both of Kanagawa, and Takao Kinoshita, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 20, 1983, Ser. No. 516,115

Claims priority, application Japan, Jul. 23, 1982, 57-128549; Jul. 23, 1982, 57-128550; Dec. 29, 1982, 57-231511

Int. Cl.⁴ G01J *1/36*

U.S. Cl. 250—204 **8 Claims**



1. A photo-detecting device comprising:

(a) photo-detecting means including a storage type photosensor arranged to produce information stored therein according to light inputs in the form of signals integrated in a real time and nondestructive manner;

(b) driving means for driving said photo-detecting means to begin to store information according to incident light;

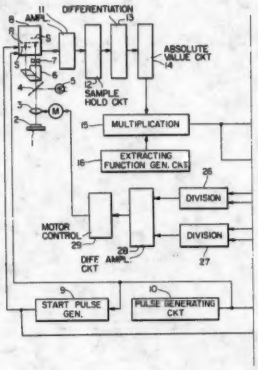
(c) comparing means for comparing the storage information of said photo-detecting means with reference information, said comparing means being arranged to produce a signal for reading out storage information from said photo-detecting means when said photo-detecting means stores a predetermined amount of information after the beginning of storing by said photo-detecting means; and

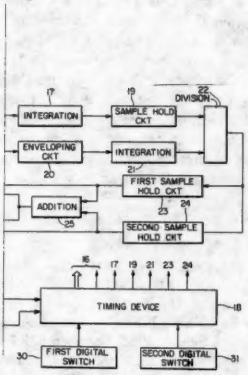
(d) switching means operatively connected to said photo-detecting means and arranged to permit reading out of the stored information of said photo-detecting means according to the signal from said comparing means.

4,587,416
FOCUS DETECTING APPARATUS FOR MICROSCOPE OR CAMERA

Koichi Kudo, Yokohama; Hidehiro Ogawa, Tokyo, and Atsushi Kawahara, Kawasaki, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Jun. 27, 1983, Ser. No. 508,166
Claims priority, application Japan, Jul. 2, 1982, 57-114082
Int. Cl.[4] G03B 3/10
U.S. Cl. 250—204 10 Claims





1. A focus detecting apparatus having optical means movable to cause the light from an object to be imaged on a predetermined plane, means for detecting an intensity distribution of the object light passed through said optical means at a first plane between said optical means and said predetermined plane and an intensity distribution of the object light passed through said optical means at a second plane at an opposite side of said predetermined plane and producing respective detection signals, and means for converting said detection signals to output signals varying in one direction from a predetermined level in response to the light intensity distribution, said apparatus comprising:

(a) means for forming an envelope of the output signal from said converting means;

(b) first integrating means for integrating said envelope and producing an integration output;

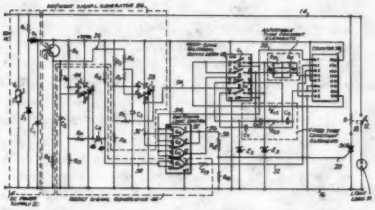
(c) second integrating means for integrating the output signal from said converting means; and

(d) focus detecting means for detecting the amount of movement of said optical means necessary for said optical means to cause the object light to be imaged on said predetermined plane in accordance with outputs from said first and second integrating means.

4,587,417
FIELD-ADJUSTABLE POWER CONTROL ARRANGEMENT AND METHODS OF CONTROLLING POWER AND OF ADJUSTING THE TIMING THEREOF

George Duve, Washington, N.J.; Harold Waage, Greentown, Pa., and Luther P. Quick, Hackettstown, N.J., assignors to Area Lighting Research, Inc., Hackettstown, N.J.

Continuation of Ser. No. 387,185, Jun. 10, 1982. This application Mar. 19, 1985, Ser. No. 713,459
Int. Cl.[4] H01J 40/14
U.S. Cl. 250—214 AL 2 Claims



1. A power control arrangement for outdoor lighting systems, comprising:

(a) sensor means, including a photocell exposed to incident light in the circumambient region of an outdoor light, and operative for detecting the ambient light intensity surrounding the outdoor light, and means for processing the incident light into a two-state digital-type signal for generating a dawn signal and a dusk signal when dawn and dusk are respectively detected;

(b) dawn/dusk control means responsive to the generation of the dawn signal and operative to electronically process one state of the digital-type signal for generating a dawn turn-off signal for turning off the outdoor light at dawn, and also responsive to the generation of the dusk signal and operative to electronically process the other state of the digital-type signal for generating a dusk turn-on signal for turning on the outdoor light at dusk;

(c) post-dusk control means responsive to the generation of the dawn and dusk signals for generating, at a nighttime turn-off time, a nighttime turn-off signal for turning off the outdoor light after dusk and upon the elapse of a first predetermined time period after midday which is established substantially midway between the detection of dawn and dusk during the day;

(d) pre-dawn control means responsive to the generation of the dawn and dusk signals for generating, at a morning turn-on time, a morning turn-on signal for turning on the outdoor light before dawn and upon the elapse of a second predetermined time period after midday;

(e) said post-dusk control means and said pre-dawn control means sharing a common up- and down-counter means for up-counting a number of counts at a contstant daytime frequency from dawn to dusk, and at a constant nighttime turn-off frequency which is double the daytime frequency from dusk to the nighttime turn-off time, up to a first predetermined up-count at which the first predetermined time period ends, and also for down-counting a number of counts at a constant morning turn-on frequency from the nighttime turn-off time to the morning turn-on time down to a first predetermined down-count at which the second predetermined time period ends;

(f) said post-dusk control means and said pre-dawn control means also sharing a common frequency control means including time constant elements, one of the time constant elements being an interior potentiometer, and another of

the time constant elements being an exterior potentiometer, and switching means for operatively connecting the time constant elements to the counter means to operate the latter from dawn to dusk at the daytime frequency, from dusk to the nighttime turn-off time at the nighttime turn-off frequency, and from the nighttime turn-off time to the morning turn-on time at the morning turn-on frequency;

(g) manual electrical adjust means, including a wiper arm on each potentiometer, for manually, electrically and adjustably setting the first and the second predetermined time periods in a continuous, infinitely variable, analog manner by varying the frequency of operation of the up- and down-counter means to thereby permit easy and rapid field adjustment and/or factory pre-adjustment of the nighttime turn-off time and the morning turn-on time for the outdoor light;

(h) automatic reset means for resetting the up- and down-counter means each day at dawn, said reset means including means responsive to the generation of the dawn and dusk signals, for generating a two-state digital-type reset signal having a reset state and a non-reset state, respectively, and means for electronically processing the reset state to generate a reset signal for resetting the up- and down-counter means; and

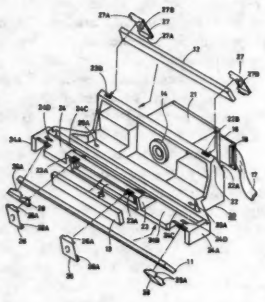
(i) pre-set means for pre-setting the counter means at a pre-set time prior to dawn, and automatic reset means for resetting the counter means each day at dawn, but only after the counter means has first been pre-set by the pre-set means.

4,587,418

OPTICAL READER WITH OPTICAL ELEMENTS MOUNTED ON MOLDINGS

Hiroshi Shirakoshi; Masafumi Matsumoto; Ryoichi Kawai, and Matahira Kotani, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 12, 1984, Ser. No. 620,007
Claims priority, application Japan, Jun. 21, 1983, 58-113183
Int. Cl.⁴ H01J *3/16*
U.S. Cl. 250—216 **7 Claims**



1. An optical reader that reads draft picture information by guiding light reflected from the optically scanned draft onto a reader element comprising;

a plurality of reflection mirrors forming an optical system for guiding the reflection light onto said reader element;

a focus lens focussing the light reflected from said reflection mirrors onto said reader element;

a molded one piece supporting member which integrally includes a plurality of reflection mirror supporting sections, a focus lens supporting section and a reader element supporting section, and

means for securing said plurality of reflecting mirrors, said focus lens and said reader elements to their corresponding said reflection mirror supporting sections, focus lens supporting section and reader element supporting section of said molded supporting member;

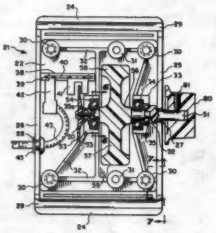
said molded one piece supporting member accurately aligning said reflection mirrors, focus lens and reader element to avoid the need for position adjustments thereto.

4,587,419

POSITION CONTROL DEVICE WITH DUAL MANUAL CONTROLS

Syng N. Kim, Hoffman Estates, Ill., assignor to Wico Corporation, Niles, Ill.

Filed Feb. 22, 1983, Ser. No. 468,504
Int. Cl.⁴ G01V *9/04*
U.S. Cl. 250—221 **18 Claims**



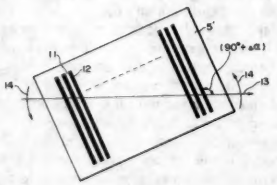
1. A position control device adapted to be mounted on an associated fixed support, said position control device comprising a housing, means for immovably mounting said housing on the associated support, said housing including two walls, each of said walls having an opening therein, a shaft mounted in said housing for rotation about the longitudinal axis thereof, one end of said shaft projecting outwardly through one of said openings, and a circular control member fixedly mounted on said shaft coaxially therewith for rotation therewith, a portion of said control member projecting through the other one of said openings for manual rotation by a user.

4,587,420

LIGHT BEAM SCANNING DEVICE FOR CORRECTING SCANNING SPEED

Masaru Noguchi, and Akihiro Ohga, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 6, 1983, Ser. No. 529,777
Claims priority, application Japan, Sep. 3, 1982, 57-153451
Int. Cl.⁴ H01J *5/16*
U.S. Cl. 250—235 **7 Claims**



1. A light beam scanning device comprising:

means for deflecting first and second light spots across a scanning plane and a planar grating pattern, respectively;

means for detecting a scanning speed of said second light spot scanning on said grating pattern; and

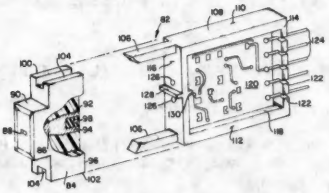
means for rotating said planar grating pattern in a first plane to vary a scanning length of said first light spot.

4,587,421

PHOTO-OPTIC TRANSDUCING HEAD ASSEMBLY

David K. Robertson, Mound, Minn., assignor to HEI, Inc., Victoria, Minn.

Filed Apr. 19, 1984, Ser. No. 601,921
Int. Cl.[4] H01J 5/02
U.S. Cl. 250—239 14 Claims



1. A photoelectric transducer assembly for detecting shifts in radiant energy at a working face thereof comprising, in combination:

(a) a generally rectangular printed circuit card means having active and passive electrical components, including radiant energy source means and a radiant energy responsive means disposed thereon at spaced apart locations along a common side edge of said card;

(b) a rectangular frame member having four mutually perpendicular sidewalls defining a central opening, one of said sidewalls having spaced apart radiant energy transmissive windows;

(c) said printed circuit card means being supported within said central opening of said frame member with said radiant energy source means and said radiant energy responsive means on said common side edge of said card means being in separate alignment with said spaced apart radiant energy transmissive windows; and

(d) a bifurcated radiant energy transmissive guide means secured to said frame member, the branches of said bifurcated guide means being in alignment with said spaced apart radiant energy transmissive windows; said guide means including a stem portion leading to said working face of said transducer assembly.

4,587,422

SUBSURFACE DENSITY TESTING METHOD

Craig R. Bowers, Rte. 6, Kirksville, Mo. 63501

Filed Jan. 6, 1984, Ser. No. 568,839
Int. Cl.[4] G01V 5/00
U.S. Cl. 250—253 20 Claims

1. A subsurface density testing method for use in calculating the quantity of coal in a coal stockpile, said method comprising the steps of:

drilling an uncased access hole in the stockpile to a preselected depth;

providing a nuclear depth density probe having an elongate flexible electrical cable extending therefrom;

inserting said probe into a thin walled protective tube with the electrical cable extending through an open end of the tube;

threading said cable through a first pipe section having a smaller diameter than the access hole;

securing said protective tube to the first pipe section;

lowering the first pipe section into the access hole to lower the probe into the hole;

threading said electrical cable successively through additional pipe sections each having a smaller diameter than the access hole, securing the pipe sections together end to end in succession to form a pipe string, and progressively lowering the pipe string into the access hole to progressively lower the probe; and

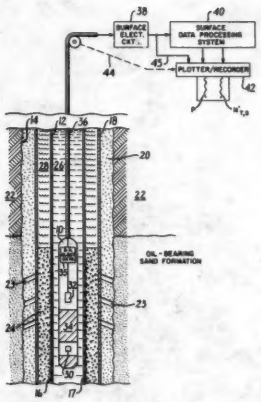
successively performing density tests with the probe at a plurality of different depths within the access hole with said electrical cable connected to a recording instrument located at the surface each time a density test is performed to record the measurements resulting from each test.

4,587,423

METHOD FOR GRAVEL PACK EVALUATION

James R. Boyce, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Jul. 31, 1984, Ser. No. 636,307
Int. Cl.[4] G01V 5/12
U.S. Cl. 250—269 4 Claims



1. A method for investigating a gravel pack located in the annulus between the tubing/screen and the casing of a borehole, comprising the steps of:

moving a logging tool, including a gamma ray source and at least one gamma ray detector, through the tubing/screen over the depth region of the gravel pack;

deriving a measurement ($N'_{T,S}$) of the number of gamma rays detected by said detector over a predetermined time interval; and

determining the percent packing (P) of the gravel pack at the depth of measurement in accordance with the relationship:

$$P = \frac{-1}{\alpha} \times \left[\rho_f + \left(\frac{1}{B'_{T,S}} \right) \times \ln \left(\frac{N'_{T,S}}{A'_{T,S}} \right) \right]$$

where

$$\alpha = \frac{(1.0 - v'_f) \times (\rho_m - \rho_f)}{100}$$

ρ_f and ρ_m are the density of the fluid and the material, respectively, in the annulus between the tubing/screen and the casing of the borehole;

v'_f is the volume fraction of the fluid in the annulus between the tubing/screen and the casing of the borehole;

$A'_{T,S}$ is a previously determined constant A'_T or A'_S depending upon whether the depth of measurement is opposite the tubing or the screen;

$B'_{T,S}$ is a previously determined constant B'_T or B'_S depending upon whether the depth of measurement is opposite the tubing or the screen; and

$N'_{T,S}$ is said measured number of detected gamma rays N'_T or N'_S depending upon whether the depth of measurement is opposite the tubing or the screen.

4,587,424

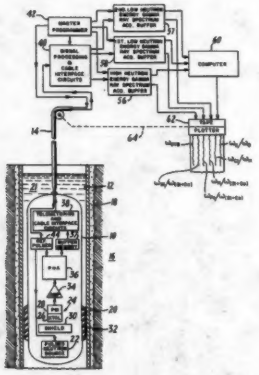
METHOD FOR INVESTIGATING THE COMPOSITION OF AN EARTH FORMATION TRAVERSED BY A BOREHOLE

James A. Grau, Danbury, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Aug. 22, 1983, Ser. No. 525,342

Int. Cl.[4] G01V 5/10

U.S. Cl. 250—270 **48 Claims**



1. A method for investigating an earth formation traversed by a borehole, comprising:

(a) placing a logging tool, including a high-energy neutron source and an energy-responsive gamma ray detector, in the borehole opposite the formation to be investigated;

(b) irradiating the borehole and surrounding formation with neutrons from said source;

(c) detecting gamma rays resulting from said neutron irradiation with said gamma ray detector;

(d) generating an energy spectrum of said detected gamma rays, said energy spectrum including (1) a contribution due to neutron interactions with the formation elements, (2) a contribution due to neutron interactions with the borehole elements, and (3) a contribution due to neutron interactions with the logging tool elements; and

(e) comparing said detected gamma ray spectrum with a composite spectrum, made up of a combination of weighted standard spectra of elements postulated to have contributed to said detected gamma ray spectrum and including among said standard spectra a tool background spectrum representing substantially only said tool contribution, to determine the relative proportions in said detected gamma ray spectrum of the gamma ray yields for one or more of said postulated elements.

4,587,425

ELECTRON BEAM APPARATUS AND ELECTRON COLLECTORS THEREFOR

Graham S. Plows, The Old Vicarage, Cowlinge, Suffolk, England

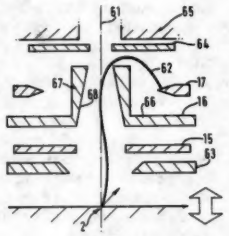
PCT No. PCT/GB83/00174, § 371 Date Mar. 6, 1984, § 102(e) Date Mar. 6, 1984, PCT Pub. No. WO84/00443, PCT Pub. Date Feb. 2, 1984

PCT Filed Jul. 15, 1983, Ser. No. 595,569

Claims priority, application United Kingdom, Jul. 16, 1982, 8220665

Int. Cl.[4] H01J 49/48

U.S. Cl. 250—305 **12 Claims**



1. Voltage measuring electron collector characterised by the combination of a filter electrode and a mirror electrode in solid form and having substantially aligned central apertures and characterised in that the filter electrode has a tubular part extending axially of, and defining the central aperture of the filter electrode, the said electrodes being operable to direct electrons that proceed through the filter electrode in the direction of the mirror electrode to a region outside the tubular part and partially bounded by said electrodes.

4,587,426

PHOTOSENSITIVE DEVICE FOR INFRARED RADIATION

Bernard Munier, Seyssinet Pariset, and Marc Arques, Grenoble, both of France, assignors to Thomson-CSF, Paris, France

Filed Nov. 9, 1984, Ser. No. 670,552

Claims priority, application France, Nov. 15, 1983, 83 18126

Int. Cl.[4] G01J 1/00

U.S. Cl. 250—338 **15 Claims**

1. A photosensitive device for infrared radiation comprising:

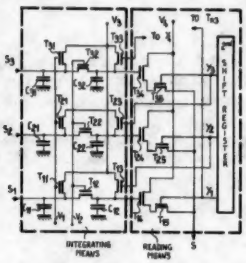
a network of N lines and M columns of infrared detectors integrated on a first semiconductor for substrate;

a first MOS transistor connected to each detector and to a first and a second electrode arrays in which one array connects the MOS transistors associated with the detectors of one line and the other array connects the transistors associated with the detectors of one column, and a first shift register which successively addresses the electrodes of the first electrode array, the MOS transistors and the register being integrated on a second semiconductor substrate and placed within a cryostat with the detectors;

means connected to each electrode of the second electrode array for carrying out integration of the charges corresponding to the radiation received by the detectors con-

nected to each electrode of the first array and for carrying out serial reading of the integrated charges, wherein said means comprise the following elements which are integrated in the second semiconductor substrate and placed within the cryostat:

a first capacitor connected to each electrode of the second array, integration of the charges corresponding to the radiation received by the detectors connected to the electrode of the first array addressed by the first shift register



being performed by said first capacitor, said first capacitor being connected to a second capacitor by a second MOS transistor in order to produce a distribution of the said charges beneath the first and the second capacitor;

means for carrying out serial reading in the second capacitors of the level of said charges during integration within the first capacitors of the charges corresponding to the radiation received by the detectors connected to the electrode of the first array addressed by the first shift register.

4,587,427

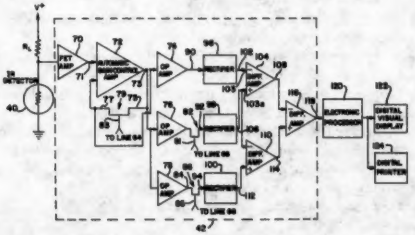
BREATH ANALYZER

Douglas C. Talbot, Vail, and James L. Witler, Avon, both of Colo., assignors to CMI, Inc., Minturn, Colo.

Filed Jul. 28, 1983, Ser. No. 517,920

Int. Cl.⁴ G01N *21/35*

U.S. Cl. 250—339 **32 Claims**



1. A system for determining the amount of a predetermined energy absorbing compound in a sample when unknown energy absorbing compounds are also present and where both the predetermined energy absorbing compound and the unknown energy absorbing compounds absorb both first and second predetermined wavelengths of energy, said system comprising, in combination, generating means for producing a first predetermined wavelength of energy and a second predetermined wavelength of energy, both said first predetermined wavelength and said second predetermined wavelength being absorbed by both the predetermined energy absorbing compound and the unknown energy absorbing compounds when both are present in the sample,

chamber means in the paths of said first and second predetermined wavelengths of energy for receiving the sample and for passing said first and second predetermined wavelengths therethrough;

detecting means in the path of said first and second predetermined wavelengths for producing a first signal proportional to the energy remaining in said first predetermined wavelength and a second signal proportional to the energy remaining in said second predetermined wavelength after each has been absorbed by said predetermined energy absorbing compound and said unknown energy absorbing compounds,

first circuit means for receiving said first signal, second circuit means for receiving both said first signal and said second signal and for subtracting them to produce a third signal, said second circuit means being adjusted so that said third signal is constant when only said predetermined energy absorbing compound is in said chamber whereby said third signal will be proportional to said unknown energy absorbing compounds in said sample, and third circuit means for receiving said first signal and said third signal and subtracting them to produce an electrical output which is proportional to said predetermined energy absorbing compound in said sample.

4,587,428

METHOD AND APPARATUS FOR THE DIAGNOSIS OF TISSUE SAMPLES

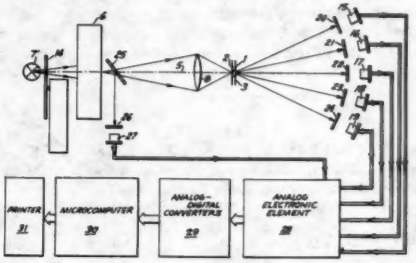
Arnold Binder, Im Münchfeld 9, 6500 Mainz 1, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 303,570, Sep. 18, 1981, abandoned. This application Oct. 5, 1983, Ser. No. 539,124

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1980, 3036610

Int. Cl.⁴ G01N *21/59, 21/51, 9/24*

U.S. Cl. 250—372 **10 Claims**



1. In a method for histological diagnosis of tissue samples, particularly for effecting quick diagnosis of tumors, including the steps of placing a solid tissue sample between a pair of planar members transparent to ultraviolet light, pressing said sample between said members to a certain thickness substantially greater than the thicknes of a single cell of said sample, passing focused ultraviolet light having an optical axis through the pressed sample in a direction transversely to said planar members, analyzing the angular distribution of ultraviolet radiation emerging from said sample and determining a dignity parameter of said sample from said analysis of said angular distribution of said emerging ultraviolet radiation, the improvement comprising determining a density parameter which is representative of information relating to the optical density of said tissue sample by sensing the portion of said ultraviolet light passing centrally through said tissue sample along the optical axis of said focused ultraviolet light, said density parameter being thus determined on the basis of said portion of said ultraviolet light passing through said tissue sample along said optical axis of said focused ultraviolet light and obtaining

a diagnosis of said tissue sample on the basis of the relationship between said dignity parameter and said density parameter.

4,587,429

METHODS OF IMPROVING RADIATION RESISTANT CHARACTERISTIC OF BF_3 PROPORTIONAL COUNTERS

Toshimasa Tomoda; Shinji Fukakusa, and Shinichi Yamashita, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

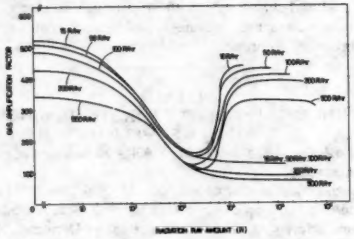
PCT No. PCT/JP83/00074, § 371 Date Dec. 6, 1983, § 102(e) Date Dec. 6, 1983

PCT Filed Mar. 11, 1983, Ser. No. 573,915

Claims priority, application Japan, Apr. 6, 1982, 57-58706; Sep. 7, 1982, 57-157254

Int. Cl.⁴ G01T *1/18*

U.S. Cl. 250—375 **6 Claims**



1. A method of improving the radiation resistant characteristic of a BF_3 proportional counter, comprising a tube having electrodes provided thereon and BF_3 gas filled therein, comprising the step of subjecting the counter before use to any one of 10^4–2×10^5 R of gamma ray, 10^4–2×10^5 R of X-ray, and 10^{10}–10^{11} nvt of thermal neutrons with a direct current high voltage applied between said electrodes.

4,587,430

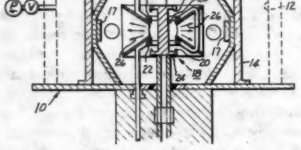
ION IMPLANTATION SOURCE AND DEVICE

Richard J. Adler, Albuquerque, N. Mex., assignor to Mission Research Corporation, Santa Barbara, Calif.

Filed Feb. 10, 1983, Ser. No. 465,655

Int. Cl.⁴ H01J *27/00*

U.S. Cl. 250—423 R **22 Claims**



1. Ion source apparatus for providing ions to be used for implantation of said ions in a surface, said apparatus being adapted to be contained in an evacuable structure, said apparatus comprising:

a spark gap comprising a pair of electrodes;

means for energizing said electrodes to produce a plasma in a region around said gap from one of said electrodes;

extraction means for extracting ions form said plasma whereby said extracted ions are available for use for ion implantation;

magnetic means disposed and arranged to confine and magnetically insulate said plasma, and direct it toward said extraction means;

pulsing means causing said first name means to energize said electrodes in time-spaced pulses; and

pulsing means means to apply to said plasma an extraction potential relative to said extraction means in time-spaced pulses.

4,587,431

SPECIMEN MANIPULATING MECHANISM FOR CHARGED-PARTICLE BEAM INSTRUMENT

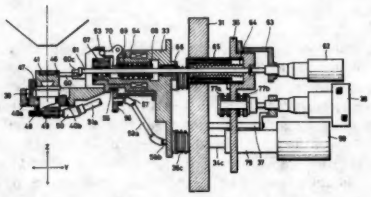
Eisuke Uemura, Akishimashi, Japan, assignor to Jeol Ltd., Tokyo, Japan

Filed Apr. 18, 1984, Ser. No. 601,652

Claims priority, application Japan, Apr. 22, 1983, 58-71105; Apr. 22, 1983, 58-71107

Int. Cl.⁴ G21K *5/10*

U.S. Cl. 250—442.1 **15 Claims**



1. A specimen manipulating mechanism adapted for use in a charged-particle beam instrument and mounted in the specimen chamber of the instrument, the manipulating mechanism being movable relative to three axes, said axes comprising a Z axis coincident with the optical axis of the charged particle beam and X and Y axes perpendicular to each other and to the Z axis, the mechanism having a tilt stage capable of tilting about the Y axis and at least two translating stages mounted on the tilt stage and capable of moving a specimen holder in at least two directions among three directions along the X, Y and Z axes, said specimen manipulating mechanism including:

two or more elongate means disposed concentrically about the Y axis;

driving mechanisms for moving the elongate means independently in the direction of the Y axis; and

two or more lever means placed between the elongate means and the translating stages carried on the tilt stage to transmit the movements of the elongate means caused by the driving mechanisms to the stages.

4,587,432

APPARATUS FOR ION IMPLANTATION

Derek Aitken, East Molesay, England, assignor to Applied Materials, Inc., Santa Clara, Calif.

Filed Aug. 3, 1984, Ser. No. 637,514

Int. Cl.⁴ A21K *27/02*; H01J *37/08*

U.S. Cl. 250—492.2 **11 Claims**

1. In a system for implanting ions into a target element,

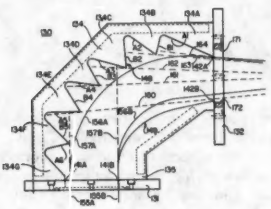
source means producing a beam comprising energetic ions of a plurality of chemical species;

beam analyzing means receiving said beam and selectively separating various ion species in said beam on the basis of mass to produce an analyzed ion beam; and

beam resolving means including a resolving slit disposed in the path of said analyzed beam for permitting ions of a preselected chemical species to pass to said target element;

said beam analyzing means comprising a pair of separated

magnetic pole faces defining an ion dispersion plane; and a beam flight tube disposed in the region between said magnetic pole faces and comprising separated inner and outer walls having respective interior wall surfaces disposed generally perpendicular to said ion dispersion plane and defining a flight tube chamber therebetween with a first end of each of said interior wall surfaces defining a beam entrance port facing said source means and a second end of each of said interior wall surfaces defining a beam exit port facing said resolving slit, said interior wall surface of said outer wall comprising first and second groups of wall surface regions, said first group being disposed to



face said beam exit port and oriented with respect to said beam entrance port such that all surface portions thereof have no direct line of sight to said ion source through said beam entrance port and are not subjected to bombardment by unselected ions, said second group being disposed to face said beam entrance port and having surface portions subjected to being struck by unselected ions from said source, said surface portions being oriented with no direct line of sight to said resolving slit through said beam exit port for any matter which may be sputtered or evaporated from said surface portions thereby preventing said matter from passing to said target element.

4,587,433

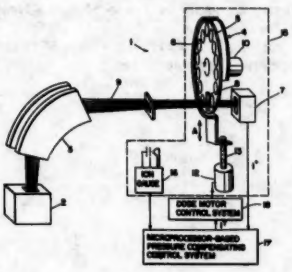
DOSE CONTROL APPARATUS

Marvin Farley, Ipswich, Mass., assignor to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 625,263, Jun. 27, 1984, Pat. No. 4,539,217. This application Apr. 3, 1985, Ser. No. 719,834

Int. Cl.⁴ G21K *5/00*

U.S. Cl. 250—492.2 **2 Claims**



1. In an ion implanter comprising a target chamber, means for directing an ion beam against one or more workpieces within said target chamber, and a dose control system for controlling the dose of ions implanted into said workpiece: means for measuring the current of the positive striking the workpiece, said current representing an apparent beam current; means for measuring the gas pressure in said target chamber; means for converting said pressure measurement to an equivalent neutral beam current signal in accordance with a predetermined relationship among said pressure, the apparent beam current, and the neutral beam current; and means for adding said neutral beam current signal to a signal representative of the apparent beam current, to provide an effective beam current signal to said dose control system.

4,587,434

CURRENCY NOTE VALIDATOR

John B. Roes; Billy B. Winkles, both of San Diego; Guy M. Kelly, La Jolla; Wayne M. Spani, San Diego, and Donald W. Schuster, Ramona, all of Calif., assignors to Cubic Western Data, San Diego, Calif.

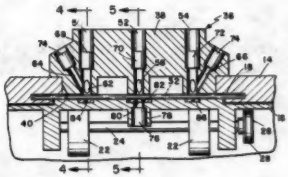
Continuation of Ser. No. 596,661, Apr. 4, 1984, abandoned, which is a continuation of Ser. No. 313,809, Oct. 22, 1981, abandoned. This application Jul. 31, 1985, Ser. No. 761,659

Int. Cl.⁴ G06K *5/00*

U.S. Cl. 250—556 **10 Claims**

MICROFICHE APPENDIX INCLUDED

(1 Microfiche, 73 Pages)



4. An apparatus for validating a currency note, comprising:

transport means for propelling the note along a longitudinally extending path;

means for taking a plurality of optical reflectance readings along a plurality of longitudinally extending, laterally spaced tracks on the note;

means for dividing each read signal by the average of the read signals for its track to generate a plurality of relative reflectance signals corresponding to each track;

means for storing acceptance band data for the type of currency note to be validated, the predetermined acceptance band data consisting of upper and lower limits for the relative reflectance signals corresponding to preselected sample areas for each of the tracks;

means for comparing selected ones of the relative reflectance readings corresponding to preselected sample areas for each track to the acceptance band data and for determining if the relative reflectance readings fall within the upper and lower limits for that sample area, means for longitudinally shifting the locations of the selected ones of the relative reflectance readings a predetermined number of positions to generate an alternate set of selected relative reflectance readings corresponding to each track, means for comparing the alternate set of selected relative reflectance readings to the acceptance band data and for determining if the alternate relative reflectance readings fall within the upper and lower limits for that sample area, and means for providing a validation signal if less than a predetermined number of the selected ones of the relative reflectance readings or the alternate set of selected relative reflectance readings fall outside their corresponding upper and lower limits.

4,587,435

TURBINE

Ross McCullough, 4101 Bath Road, Kingston, Ontario, Canada (K7M 4Y8)

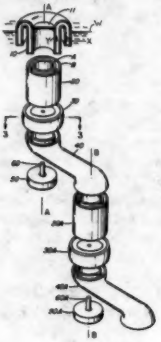
Filed May 10, 1984, Ser. No. 608,859

Int. Cl.⁴ F15D *1/02*

U.S. Cl. 290—54 **15 Claims**

1. In a hyudro-electric power generating system the im-

provement comprising directing an annular column of water flow, from the intake thereof from a head of water, through a



turbine drivingly connected to an electric generator and through to the discharge at an elevation below said intake.

4,587,436

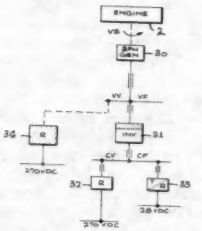
AIRCRAFT PROVIDING VARIABLE AND CONSTANT ELECTRIC POWER

Michael J. Cronin, Sherman Oaks, Calif., assignor to Lockheed Corporation, Burbank, Calif.

Filed Jul. 28, 1980, Ser. No. 173,111

Int. Cl.[4] H02J *3/14*

U.S. Cl. 307—21 **13 Claims**



1. In an aircraft having at least one variable speed engine first electricity driven subsystems and devices including fuel pumps, electrohydraulic pumps, electric-galley, de-icing, and environmental control subsystems, and second electrically driven subsystems and devices including solenoids, control valves, shut-off valves, indicators, lamps and instruments, the improvement comprising:

generator means associated with and adapted to be driven by said at least one aircraft engine continuously and at variable speeds, said generator means being further adapted for generating primary variable-voltage/variable-frequency power to said first electrically driven subsystems and devices; and

means associated with said primary power generating means for converting a minor portion of said primary variable-voltage/variable-frequency power to conditioned secondary power for said second electrically driven subsystems and devices.

4,587,437

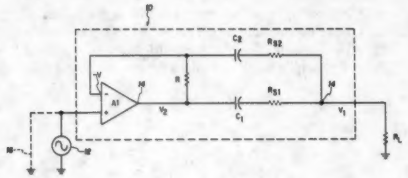
COUPLING/DECOUPLING CAPACITOR MULTIPLIER

Ian A. Schorr, Chicago, Ill., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 19, 1984, Ser. No. 590,400

Int. Cl.[4] H03H *7/10*

U.S. Cl. 307—109 **1 Claim**



1. An improved coupling/decoupling capacitor multiplier having an input terminal connected to a power source and an output terminal connected to a load, comprising:

means for amplifying having an open loop gain of K(S), an inverting input and a non-inverting input and an output said non-inverting input being connected to said input terminal;

a first capacitor C1 being generally lossy and connected to said output of saida amplifier means;

a second capacitor C2 being generally lossless and connected in series with said first capacitor and disposed between said first capacitor and said inverting input of said amplifier means, a junction of said first and second capacitor being connected to said output terminal;

a resistor having an appropriate value connected between said inverting input and said output of said amplifier means, and operatively connected in series with said capacitors; and

wherein said multiplier is a two terminal passive device having an equivalent capacitance of $C1/[1/K(S)+C1/C2\times RS1/R]$ whereby the equivalent capacitance of said multiplier is substantially equal to the product of C1 and K(S) when R has said appropriate value.

4,587,438

TURN-OFF CIRCUIT FOR GATE TURN-OFF THYRISTOR

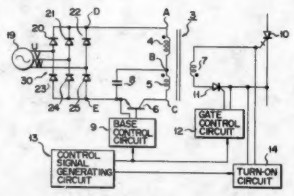
Koichi Murakami, Glenview, Ill., and Katsuyoshi Mase, Kawasaki, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Jan. 6, 1984, Ser. No. 568,912

Claims priority, application Japan, Jan. 12, 1983, 58-3014

Int. Cl.[4] H03K *17/72*

U.S. Cl. 307—252 C **8 Claims**



1. A turn-off circuit for a gate turn-off thyristor comprising:

a three-phase full-wave rectifier for full-wave rectifying three-phase AC voltages, and having a pair of output terminals;

a pulse transformer having primary and secondary windings;

a switching element;

said primary winding of said pulse transformer and said

switching element connected in series between said pair of output terminals of said rectifier;

a charge/discharge capacitor connected at one end to one of the pair of said output terminals of said rectifier, and at the other end to a predetermined point of said primary winding;

a gate turn-off thyristor connected to receive a turn-off current through said secondary winding of said pulse transformer; and

a control ciruit fór receiving a turn-off signal with a predetermined pulse width to turn on said switching element so that said gate turn-off thyristor receives a turn-off current through said secondary winding of said pulse transformer and is turned off.

4,587,439

PULSE GENERATOR COMPRISING AT LEAST TWO VOLTAGE COMPARISON CIRCUITS

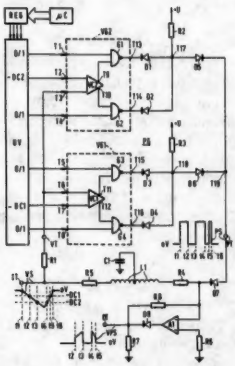
Frederik J. Van Roessel, Upper Saddle River, N.J., assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 29, 1982, Ser. No. 454,213

Claims priority, application Netherlands, Jan. 22, 1982, 8200235

Int. Cl.⁴ H03K *5/04, 3/023*

U.S. Cl. 307—265 **6 Claims**



1. In pulse generator apparatus comprising a voltage source furnishing at least two threshold values, and a pulse generator having said threshold values applied thereto and having a pulse generator input for receiving a variable amplitude input voltage and a pulse generator output for supplying pulses having pulse edges occurring at instants at which the instantaneous input voltage value corresponds to one of said threshold values, said pulse generator comprising at least two voltage comparison circuits, the improvement wherein

each of said voltage comparison circuits has a first and second comparison output, a first and second comparison input for receiving two voltages to be compared and third and fourth comparison inputs for receiving blocking voltages for blocking the transmission of signals to said first and second comparison output, respectively;

wherein one of said first or said second comparison inputs of each of said voltage comparison circuits is coupled to said pulse generator input, the other of said first or second comparison inputs being coupled to said voltage source, the first and second comparison outputs of each voltage comparison circuit being coupled to each other and to said pulse generator output at least in part via logic elements operating independently for each voltage comparison circuit.

4,587,440

WAVEFORM SHAPING CIRCUIT INCLUDING I^2L ELEMENT

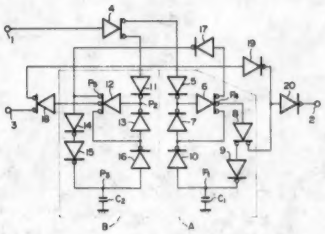
Koichi Nakayama, Hatoyama, and Yoshito Tanaka, Kawagoe, both of Japan, assignors to Toko, Inc., Tokyo, Japan

Filed Jul. 1, 1983, Ser. No. 510,169

Claims priority, application Japan, Jul. 6, 1982, 57-116169; Feb. 28, 1983, 58-28485[U]

Int. Cl.⁴ H03K *3/033, 5/04, 19/091*

U.S. Cl. 307—268 **3 Claims**



1. A waveform shaping circuit, comprising:

a first monostable multivibrator consisting of a first capacitor, said first monostable multi-vibrator including a first latch circuit, said first latch circuit comprising first and second I^2L elements, said second I^2L element having an output terminal connected to an input terminal of said first I^2L element, and a circuit for releasing the action of said first latch circuit, said first latch releasing circuit comprising a third I^2L element having an output connected to an output of said first I^2L element and an input of said second I^2L element; and

a second monostable multivibrator consisting of a second capacitor, said second monostable multivibrator including a second latch circuit, said second latch circuit comprising fourth and fifth I^2L elements, said fifth I^2L element having an output terminal connected to an input terminal of said fourth I^2L element, and a circuit for releasing the action of said second latch circuit, said second latch releasing circuit comprising a sixth I^2L element having an output connected to an output of said fourth I^2L element and an input of said fifth I^2L element;

an output terminal connected to said multivibrators;

wherein when said first monostable multivibrator is operated, the second latch circuit is operated and the circuit for releasing the action of said second latch circuit is prevented from being operated, by means of a signal resulting from the operation of said first monostable multivibrator, thereby preventing said second monostable multivibrator from being operated; and after the operation of said first monostable multivibrator is completed, said second monostable multivibrator is operated, whereby a signal corresponding to a combination of the outputs of said first and second monostable multivibrators is provided as an output signal at said output terminal.

4,587,441

INTERFACE CIRCUIT FOR SIGNAL GENERATORS WITH TWO NON-OVERLAPPING PHASES

Guido Torelli, S. Alessio, and Daniele Devecchi, Desio, both of Italy, assignors to SGS-ATES Componenti Elettronici S.p.A., Milan, Italy

Filed Oct. 13, 1983, Ser. No. 541,728

Claims priority, application Italy, Oct. 22, 1982, 23869 A/82

Int. Cl.⁴ H03K *3/353, 3/017, 5/156, 5/05*

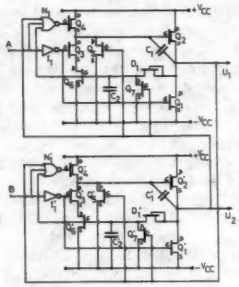
U.S. Cl. 307—269 **13 Claims**

1. An interface circuit for use with a pair of timing signals with two non-overlapping phases and having rectangular pulse waveforms, said circuit comprising a pair of identical circuits

with field-effect transistors, each identical circuit having an input terminal for connection to one of said pair of timing signals and having an output terminal for connection to a user circuit, each circuit of said pair of identical circuits having a final stage comprising:

a first transistor having source, drain, and gate electrodes and a second transistor having source, drain, and gate electrodes, said source electrode of said first transistor being connected to a first terminal of a supply voltage generator, and said drain electrode of said second transistor being connected to a second terminal of said supply voltage generator, said drain electrode of said first transistor being connected to said source electrode of said second transistor such that the junction point of said first and second transistors constitute said output terminal of said circuit, said gate electrode of said first transistor being coupled to the input terminal of said circuit by means of an inverter circuit, said gate electrode of said second transistor being coupled to said junction point of said first and second transistors by means of a capacitive circuit element and connected, by means of a first switching circuit means, to said second terminal of said supply voltage generator and, by means of a second switching circuit means, to said first terminal of said supply voltage generator;

wherein each of said pair of identical circuits comprises:



a logic NOR circuit means operatively connected to said first switching circuit means for controlling said first switching circuit means;

an AND logic circuit means operatively connected to said second switching circuit means for controlling said second switching circuit means;

said AND logic circuit means comprising a memory element which is responsive to and indicative of said output signals from said pair of identical circuits and which, upon an occurrence of a leading edge of each of said rectangular pulses of said output signals from said pair of identical circuits, stores the level of the output signal of its associated circuit, transmitting a signal up to an occurrence of a leading edge of a subsequent rectangular output pulse signal of said output signals from said pair of identical circuits, said transmitted signal having a constant level equal to said stored level, said transmitted signal from said memory element being fed to a first input terminal of said NOR logic circuit and to a first input terminal of said logic AND circuit;

said logic NOR circuit having a second and a third input terminal connected to, respectively, said input terminal of its associated circuit and to the output terminal of that circuit of said pair of identical circuits other than its associated circuit;

said logic AND circuit having a second input terminal coupled by means of said inverter circuit to said input terminal to its associated circuit.

4,587,442

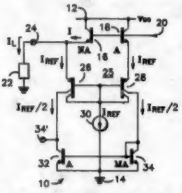
CURRENT THRESHOLD DETECTOR

Randall C. Gray, Scottsdale, Ariz., and Eric D. Joseph, Yorba Linda, Calif., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 1, 1983, Ser. No. 557,025

Int. Cl.[4] H03K *5/153*; G01R *19/165, 19/175*

U.S. Cl. 307—350 **9 Claims**



1. Detector circuit for sensing when the magnitude of an output current sourced therefrom varies above and below a predetermined current threshold level, comprising:

transistor circuit means for sourcing first and second currents at first and second outputs which establish first and second voltages the magnitudes of which are a function of said first and second currents and which vary inversely with respect to each other as the output current varies, said first output being coupled to an output of the detector; and

error amplifier means which monitors said first and second voltages for producing an error signal at an output the sense of said error signal being caused to change as the output current varies above and below the current threshold level, said error amplifier means including a current source for sinking a substantially constant reference current, the magnitude of which is fixed and comprises said first and second currents, the ratio of said first and second currents comprising said reference current being a function of the difference between said magnitudes of said first and second voltages.

4,587,443

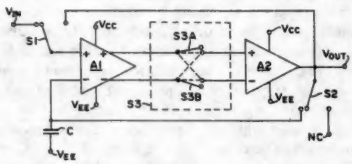
AUTO-ZERO SAMPLE AND HOLD CIRCUIT

Rudy J. van de Plassche, Cupertino, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Aug. 27, 1984, Ser. No. 644,744

Int. Cl.[4] G11C *27/02*

U.S. Cl. 307—353 **6 Claims**



1. A sample and hold circuit comprising:

first means for amplifying a differential signal between non-inverting and inverting inputs thereof to produce a differential signal between non-inverting and inverting outputs thereof;

second means for amplifying a differential signal between non-inverting and inverting inputs thereof to produce a signal at an output thereof:

a storage capacitor coupled to the inverting input of the first means:

a first switch for selectively coupling the non-inverting input of the first means to a circuit input terminal for receiving

an input signal during a sample mode or to the output of the second means during a hold mode;

a second switch for selectively coupling the output of the second means to the inverting input of the first means during the sample mode or to a high-impedance position during the hold mode; and

a third switch for selectively coupling the non-inverting and inverting outputs of the first means respectively to the non-inverting and inverting inputs of the second means during the sample mode or respectively to the inverting and non-inverting inputs of the second means during the hold mode.

4,587,444

VARIABLE-THRESHOLD-TYPE DIFFERENTIAL SIGNAL RECEIVER

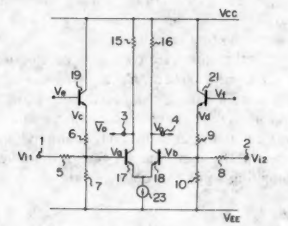
Shinji Emori, Urawa, and Yoshio Watanabe, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

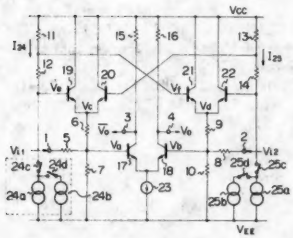
Filed Jul. 12, 1983, Ser. No. 513,057

Claims priority, application Japan, Jul. 13, 1982, 57-122575

Int. Cl.[4] H03K *5/24, 19/003, 19/086*

U.S. Cl. 307—355 **10 Claims**





1. A variable-threshold-type differential signal receiver operatively connected to receive input voltages and having a differential amplifier for comparing differential voltages of differential input signals with a predetermined threshold voltage so as to provide logical output signals, comprising:

a first emitter follower operatively connected to receive the input voltage and providing an output;

first impedance means comprising a resistor network, operatively connected to said first emitter follower, for superimposing the output of said first emitter follower on one of the received differential input signals, the predetermined threshold voltage being variably controlled by controlling the input voltage of said first emitter follower;

said differential amplifier comprising:

a first NPN transistor having a base operatively connected to receive a first differential input signal and having an emitter and a collector;

a second NPN transistor having an emitter operatively connected to the emitter of said first NPN transistor, having a base operatively connected to receive a second differential input signal and having a collector, the output voltage of said first emitter follower and one of said first and second differential input signals being combined and voltage divided by said resistor network, the divided output voltage of said first emitter follower being applied to the base of one of said first and second NPN transistors;

a first current source operatively connected between the emitters of said first and second NPN transistors and a low voltage power supply line;

a first resistor operatively connected between the collector of said first NPN transistor and a high-voltage power supply line;

a second resistor operatively connected between the collector of said second NPN transistor and said high-voltage power supply line; and

at least one output terminal connected to the collector of one of said first and second NPN transistors, said output terminal being adapted to provide the logical output signals.

4,587,445

DATA OUTPUT CIRCUIT WITH MEANS FOR PREVENTING MORE THAN HALF THE OUTPUT LINES FROM TRANSITIONING SIMULTANEOUSLY

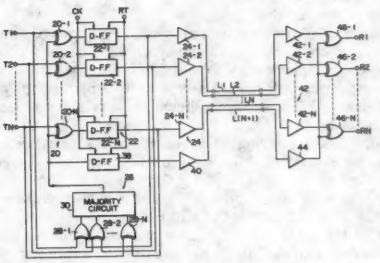
Akira Kanuma, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Filed May 16, 1984, Ser. No. 610,668

Claims priority, application Japan, May 18, 1983, 58-87040

Int. Cl.[4] H03K *17/16, 19/003*

U.S. Cl. 307—443 **11 Claims**



1. A data output circuit comprising:

data input terminals for receiving logic signals of input data;

a latching means, connected to the data input terminals, to hold the logic signals of input data in accordance with a first control signal and the inverted replica of said logic signals in accordance with a second control signal;

a control signal generating means for checking the coincidence between each of the logic signals of updated input data applied to the data input terminals and a corresponding one of the output signals of said latching means, and supplying the first control signal when it is detected that the number of the logic signals of said updated input data, which are same in logic level as their corresponding output signals of said latching means, is larger than a preset value, and also supplying the second control signal when it is detected that the number of the logic signals of said updated input data, which are same in logic level as their corresponding output signals of said latching means, is not larger than the preset value;

a notation signal generating means for generating a logic notation signal, which represents the logic notation with respect to the output signals of said latching means, in accordance with an output signal applied from said control signal generating means; and

output buffer means for supplying logic signals which correspond to the output signals of said latching means and the logic notation signal applied from the notation signal generating means.

4,587,446

FIELD EFFECT TRANSISTOR OUTPUT CIRCUIT OPERABLE BY A REDUCED AMOUNT OF CURRENT

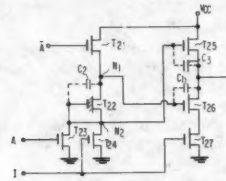
Koichiro Okumura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed May 31, 1983, Ser. No. 499,704

Claims priority, application Japan, May 28, 1982, 57-90614

Int. Cl.⁴ H03K *17/693*

U.S. Cl. 307—473 **13 Claims**



1. An output circuit comprising:

a first voltage terminal,

a second voltage terminal,

an output terminal,

a first transistor having a drain-source path coupled between said first voltage terminal and said output terminal,

second and third transistors having drain-source paths coupled in series between said output terminal and said second voltage terminal,

a data input terminal,

a first control terminal for receiving a first control signal,

a second control terminal for receiving a second control signal complementary to said first control signal,

a fourth transistor having a drain-source path coupled between said first voltage terminal and a gate of said second transistor,

a fifth transistor having a drain-source path coupled between a gate of said first transistor and said second voltage terminal,

impedance means coupled between the gate of said second transistor and the gate of said first transistor,

a sixth transistor having a drain-source path connected in parallel with the drain-source path of said fifth transistor,

means for coupling gates of said third and sixth transistors to said data input terminal,

means for coupling a gate of said fifth transistor to said first control terminal, and

means for coupling a gate of said fourth transistor with said second control terminal.

4,587,447

INPUT SIGNAL LEVEL CONVERTER FOR AN MOS DIGITAL CIRCUIT

Manfred Baehring, Unterschleissheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 4, 1984, Ser. No. 607,267

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1983, 3323446

Int. Cl.⁴ H03K *4/58, 17/10, 17/687, 19/094*

U.S. Cl. 307—482 **4 Claims**

1. An input signal level converter for combination with an MOS digital circuit comprising:

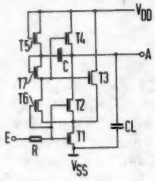
a signal input for connection to a TTL signal and connected for control of first and second MOS field effect transistors;

a source terminal of the first transistor being connected to reference potential and its drain terminal connecting to a source terminal of the second transistor and also through a source-drain path of a third MOS field effect transistor to a supply potential;

a drain terminal of the second transistor connecting to a signal output of the converter, and connecting to the supply potential via a parallel connection of a fourth MOS field effect transistor and a series connection of a bootstrap capacitor and a fifth MOS field effect transistor connected as a resistor;

the signal output being directly connected to a signal input of said MOS digital circuit, said MOS digital circuit having a same reference potential and a same supply potential as the signal level converter;

sixth and seventh MOS field effect transistors;



a source terminal of the sixth transistor connecting to a drain terminal of the first transistor and its gate being connected to a gate of the first transistor;

a drain terminal of the sixth transistor being connected to a gate of the third transistor, a drain terminal of the seventh transistor, and a gate of the fourth transistor; and

a source terminal of the seventh transistor connecting to said bootstrap capacitor, and also connecting to a source terminal of the fifth transistor, and a gate of the seventh transistor connecting to its source terminal.

4,587,448

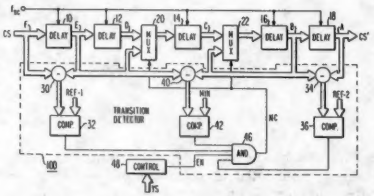
SIGNAL TRANSITION DETECTION CIRCUIT

Eric P. Batterman, Philadelphia, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Jul. 27, 1983, Ser. No. 517,841

Int. Cl.⁴ H03K *5/153, 5/12, 6/04*

U.S. Cl. 307—517 **20 Claims**



1. A signal detection circuit for developing a detection indication comprising:

a source of signal samples representing a time varying signal means coupled to said source for simultaneously providing a plurality of said signal samples each successively delayed in time with respect to a given sample;

first detecting means responsive to a first group of said signal samples for developing a first indication when the magnitude of the samples in said first group differ by less than a first predetermined value;

second detecting means responsive to two of said signal samples for developing a second indication when the magnitudes of said two signals samples differ by more than a second predetermined value; and

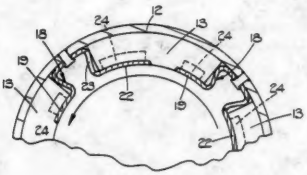
third detecting means for developing said detection indication in response to said first and second indications.

4,587,449

PERMANENT MAGNET ROTARY DYNAMO ELECTRIC MACHINE

John G. W. West, Pershore, England, assignor to Lucas Industried Limited, Birmingtham, England

Filed Nov. 16, 1983, Ser. No. 552,330
Claims priority, application United Kingdom, Nov. 22, 1982, 8233268
Int. Cl.[4] A02K *21/26*
U.S. Cl. 310—154 19 Claims



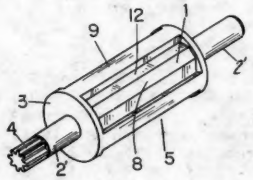
1. A permanent magnet rotary dynamo electric machine wherein each permanent magnet pole has a weak tip region and a strong tip region and is provided at said strong tip region only with a flux shunt in the form of a shield of material of high saturation flux density engaging the air gap face of the strong tip region of the pole and also engaging the part of the iron circuit of the machine upon whch the permanent magnet pole is supported so as to provide a direct flux path between the air gap at the strong tip region of the pole and the iron circuit, said direct flux path being arranged to shunt magnet flux from said strong tip region of each pole to the iron circuit when the current in the associated winding is low, but to be saturated by flux flowing in the opposite direction at high values of winding current, there being no flux shunt at the weak tip region of each pole.

4,587,450

SYNCHRONOUS MOTOR ROTOR

Osamu Ozaki, Komaki, Japan, assignor to Sanyei Corporation, Japan

Filed Jan. 6, 1984, Ser. No. 568,585
Int. Cl.[4] H02K *21/12*
U.S. Cl. 310—156 12 Claims



1. A rotor for a motor comprising: a support, the support having first and second opposite ends for mounting the support within a motor and having a central portion between the first and second opposite ends, the support being rotatable around an axis in relation to the motor, the central portion having an internal opening; and

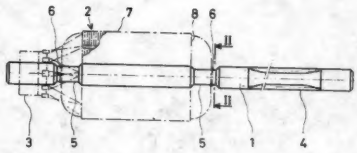
a magnet lacking holes therein for connecting the magnet to the support mounted in the opening in the central portion of the support, the magnet having first and second end surfaces disposed toward the first and second opposite ends of the support, respectively, the support supporting the magnet by abutting the magnet and without requiring holes in the magnet to support it, at least the central portion of the support comprising an outer covering of synthetic resin formed upon the magnet, the outer covering entirely covering the first and second flat end surfaces of the magnet and the outer covering over the side peripheral surface of the magnet having windows defined in it, giving access to the magnet.

4,587,451

ROTOR FOR A SMALL ELECTRIC MOTOR HAVING REDUCED SHAFT PORTION TO IMPROVE WINDINGS

Francis Savelli, Champigny, France, assignor to Ducellier & Cie, Creteil, France

Filed Jun. 26, 1984, Ser. No. 624,742
Claims priority, application France, Jul. 21, 1983, 83 12054
Int. Cl.[4] H02K *3/04*
U.S. Cl. 310—208 4 Claims



1. In a rotor for a small electric motor, particularly of the type suitable for automotive use such as in a window operating device, comprising:

a rotor shaft and an armature including a stack of metal sheets mounted on said rotor shaft to rotate therewith, said armature having slots in which electrical conductors are wound; and

a groove disposed in said rotor shaft at each end of said rotor shaft adjacent said armature, each said groove having a depth sufficient to allow said electrical conductors passing across the respective said end of said armature between non-adjacent substantially opposed slots to be substantially rectilinear where said electrical conductors are disposed adjacent said rotor shaft;

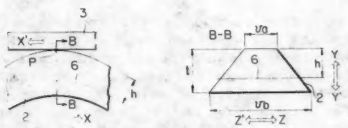
said rotor shaft having a predetermined diameter on which said armature is mounted, for supporting said armature; said predetermined diameter being greater than a diameter of said rotor shaft at the location of each said groove.

4,587,452

VIBRATION WAVE MOTOR HAVING A VIBRATOR OF NON-UNIFORM ELASTIC MODULUS

Ichiro Okumura, Tokyo, and Kazuhiro Izukawa, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 11, 1984, Ser. No. 598,972
Claims priority, application Japan, Apr. 30, 1983, 58-76753
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 19 Claims



1. A vibration wave motor comprising:

electrostrictive elements;

a vibration member for generating a travelling vibration wave when voltages having a phase difference therebetween are applied to said electrostrictive elements, said vibration member having a non-uniform elastic modulus

in a direction of amplitude of the travelling vibration wave; and

a movable member frictionally driven by the travelling vibration wave generated in said vibration member.

4,587,453

LOW-PRESSURE MERCURY VAPOR DISCHARGE LAMP

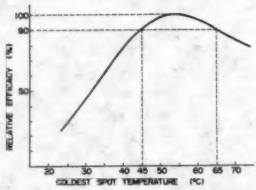
Tetsuo Ono, Kokubunji; Yoshio Watanabe, Tokyo; Hiromitsu Matsuno, Hachioji; Yasuo Kato, Zama; Seiichi Murayama, Kokubunji, and Shigeo Mikoshiba, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 25, 1983, Ser. No. 516,913

Claims priority, application Japan, Jul. 30, 1982, 57-131935

Int. Cl.⁴ H01J *61/34, 61/52*

U.S. Cl. 313—25 **5 Claims**



1. A low-pressure mercury vapor discharge lamp comprising an envelope forming a gas-tight closed space, a pair of inner tubes provided in said gas-tight closed space and having an end sealed at the first end of said envelope, the other end of said pair of inner tubes being opened in said gas-tight closed space, electrodes provided on the sealed end sides of said pair of inner tubes, and means for setting a value of lamp input power per unit surface area of said envelope in the range between 0.03 W/cm^2 and 0.10 W/cm^2 so that a temperature of a coldest spot of said envelope is in a range between 45° C. and 54° C. at an ambient temperature of 25° C.

4,587,454

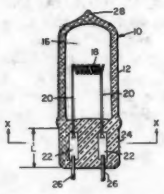
INCANDESCENT LAMP WITH IMPROVED PRESS SEAL

Robert P. Bonazoli, South Hamilton, Mass., and Owtis J. Ragland, Jr., Winchester, Ky., assignors to GTE Products Corporation, Stamford, Conn.

Filed May 17, 1984, Ser. No. 611,553

Int. Cl.⁴ H01J *5/50*

U.S. Cl. 313—331 **9 Claims**



1. In an electric lamp including an envelope comprised of a high silica glass material and having a press sealed end, a thin molybdenum foil having opposed longitudinal sides and entirely embedded within said press sealed end, a first conductor connected to said molybdenum foil and extending interiorly of said envelope, and a second conductor connected to said molybdenum foil and extending exteriorly of said envelope, the improvement wherein said foil is of substantially flat configuration and includes outwardly extending tapered end segments, each of said opposed longitudinal sides of said molybdenum foil possessing a rough surface for substantially adhering to said glass material of said press sealed end when said end is subjected to elevated temperatures, the expansion forces of said molybdenum foil having said tapered end segments and said rough surfaces within said longitudinal sides thereof being substantially evenly distributed within said molybdenum foil against said glass material during said elevated temperatures, thereby substantially preventing crack formation within said press sealed end about said molybdenum foil.

4,587,455

CONTROLLED POROSITY DISPENSER CATHODE

Louis R. Falce, Marina Del Rey, and Glenn S. Breeze, Lomita, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 433,586, Oct. 12, 1982, abandoned.

This application May 21, 1985, Ser. No. 736,955

Int. Cl.⁴ H01J *1/14, 9/04*

U.S. Cl. 313—346 DC **21 Claims**

1. A method for fabricating a dispenser-reservoir housing for a controlled porosity dispenser cathode comprising the steps of:

coating the side surface and adjacent end surface of a configured metal mandrel with a first metal coating which atomically bonds to said mandrel by means of crystalline growth into a unitary piece;

removing the mandrel to form a housing of the first metal coating having a side wall and an end wall which define a reservoir; and

forming an array of apertures through the end wall in open communication with the reservoir to form an emitter surface.

4,587,456

IMAGE PICKUP TUBE TARGET

Eisuke Inoue; Yasuhiko Nonaka, and Masanao Yamamoto, all of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 17, 1984, Ser. No. 571,473

Int. Cl.⁴ H01J *31/10, 31/26*

U.S. Cl. 313—366 **9 Claims**

1. An image pickup tube target comprising:

a transparent substrate;

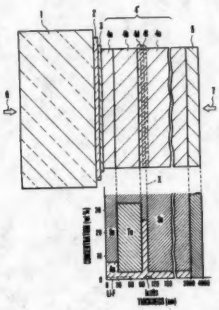
a first transparent conductive film formed on a rear major surface of said transparent substrate;

a second transparent conductive film serving as a blocking layer and formed on a rear major surface of said first transparent conductive film;

a multilayer photoconductive film which has first amorphous semiconductor layer mainly made of Se and As, second amorphous semiconductor layer mainly made of Se, Te, and As, third amorphous semiconductor layer mainly made of Se and As, and fourth amorphous semiconductor layer mainly made of Se and As with an average concentration of As being lower than that in third layer, in the order named,

which is formed on a rear major surface of said second transparent conductive film to have a predetermined thickness;

a single photoconductive film formed on a rear major surface of said fourth amorphous semiconductor layer of said multilayer photoconductive film; and



a layer doped with a dopant having negative space charges in selenium and formed across an interface between said third and fourth amorphous semiconductor layers of said multilayer photoconductive film, not to contact said second amorphous semiconductor layer.

4,587,457

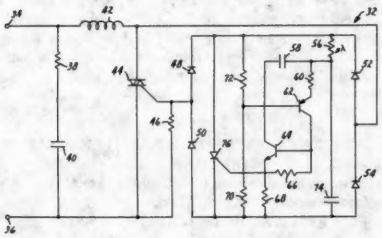
MULTIPLE INTENSITY LAMP CONTROLLER AND LIGHTING SYSTEM

Peter A. Lind, Afton Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 19, 1982, Ser. No. 350,153

Int. Cl.[4] H01J *7/44, 13/46, 17/34, 19/78, 23/16, 29/96*

U.S. Cl. 315—64 **20 Claims**



1. A multiple intensity lamp controller adapted to be coupled to a multiple filament lamp having at least a primary filament and a secondary filament coupled in series with each of other and to a power source, comprising a variable impedance coupled across said secondary filament wherein the intensity of said multiple filament lamp is comparatively bright when the valve of said variable impedance is comparatively low and wherein the intensity of said multiple filament lamp is comparatively dim when the value of said variable impedance is comparatively high; whereby any range of failure in the value of said variable impedance will result in said multiple filament lamp still being lit.

4,587,458

CONTROLLING CURRENT DENSITY

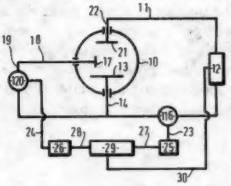
John Davenport, Cambridge, England, and Michael A. Russo, Trevose, Pa., assignors to TI (Group Services) Limited, Birmingham, England

Filed Jul. 11, 1984, Ser. No. 629,812

Claims priority, application United Kingdom, Feb. 17, 1984, 8404173

Int. Cl.[4] G01N *23/00;* **H01J** *7/24*

U.S. Cl. 315—111.01 **9 Claims**



1. Current density controlling apparatus, for controlling the density of an electric current at the surface of a workpiece during gaseous ionic surface treatment of the workpiece, including a chamber in which the workpiece is located and connected as one electrode of one polarity, a second electrode operative within the chamber and connected at the opposite polarity, gas supply means to provide a gaseous atmosphere within the chamber of required composition, temperature and pressure, wherein the improvement comprises a third electrode of known area within the chamber connected to be at the same polarity and potential as the workpiece, and located adjacent the workpiece and current measuring means connected to measure the current passing through the third electrode and thereby to provide one of a measurement and control of the common current density at the surface of the third electrode and of the workpiece.

4,587,459

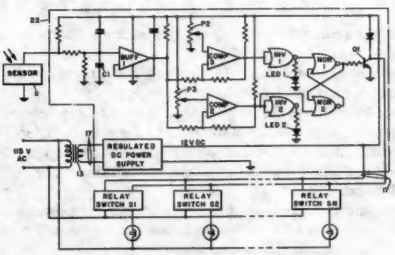
LIGHT-SENSING, LIGHT FIXTURE CONTROL SYSTEM

Frederick H. Blake, 226 W. Edith No. 28, Los Altos, Calif. 94022

Filed Dec. 27, 1983, Ser. No. 565,582

Int. Cl.[4] H05B *37/02*

U.S. Cl. 315—158 **10 Claims**



1. A light-sensing, light fixture control system that can be used in conjunction with a conventional high-voltage lighting system; having a conventional high-voltage power source system; said control system comprised of:

a light sensor mounted in optical communication with the ambient light near a light fixture;

a switch interposed in a circuit furnishing electrical power to the light fixture;

a power source for supplying voltage of no greater than 20

volts at an amperage of no greater than 8 amperes to a control circuit; said power source located immediately adjacent a conventional power source for electrical attachment thereto; and

a control circuit electrically connected to the sensor and to the switch for activating the switch in response to detection of predetermined light levels by the light sensor;

wherein the control circuit is further comprised of:

high-level adjusting means for manually selecting a level of ambient light as detected by the sensor for activating the switch so as to open the circuit to the light fixture;

low-level adjusting means for manually selecting a level of ambient light as detected by the sensor for activating the switch so as to close the circuit to the light fixture;

said light sensor switch, control circuit, and power source for disposition to a conventional lighting system such that no additional high-voltage conduit is required.

4,587,460

HIGH-PRESSURE DISCHARGE LAMP OPERATING CIRCUIT

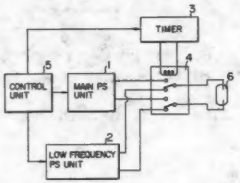
Seiichi Murayama; Makoto Yasuda, both of Kokubunji; Tsune Miyashita, Tokyo; Yoji Arai, Katsuta; Kenichi Kawasumi, Ome, and Kazunori Kinoshita, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 24, 1984, Ser. No. 603,431

Claims priority, application Japan, Apr. 27, 1983, 58-72892

Int. Cl.[4] H05B *41/14, 41/26*

U.S. Cl. 315—174 **6 Claims**



1. A circuit for operating a high-pressure discharge lamp comprising:

discharge ignition means for igniting a discharge between a pair of main electrodes in an arc tube;

first power means for providing a low-frequency alternating electric power to said arc tube at least until an arc spot produced at each of said main electrodes by the ignition of said arc tube is located at a desired position on each of said electrodes;

second power means for providing an electric power to said arc tube after said arc spot is located at the desired position on each of said electrodes; and

control means for controlling the operation of said discharge ignition means, said first power means and said second power means, so that said discharge ignition means applies a discharge voltage to said arc tube until a discharge is ignited between said pair of main electrodes, said low-frequency electric power is applied to said arc tube until said arc spot is located at said desired position on each of said electrodes, and electric power is supplied to said arc tube thereafter from said second power means for normal operation of the arc tube.

4,587,461

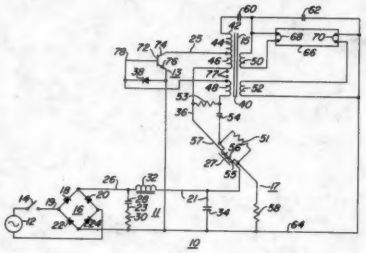
SELF-REGULATING ELECTRONIC BALLAST SYSTEM

Jacques M. Hanlet, Loxahatchee, Fla., assignor to Intent Patents A.G., Liechtenstein

Continuation-in-part of Ser. No. 500,147, Jun. 1, 1983, Pat. No. 4,503,362. This application Feb. 23, 1984, Ser. No. 580,624

Int. Cl.[4] H05B *37/02*

U.S. Cl. 315—224 **30 Claims**



1. A self-regulating electronic ballast system having a power source for actuating at least one gas discharge tube with a regulated current to maintain said gas discharge tube output and input power at a predetermined value, comprising:

(a) filter means connected to said power sourece for (1) maintaining a substantially smooth direct current voltage signal, and (2) suppressing harmonic frequencies generated by said electronic ballast system;

(b) induction means coupled to said filter means and having a tapped primary winding providing an auto-transformer configuration for generating a voltage across said gas discharge tube responsive to said regulated current, said induction means having a multiplicity of secondary windings said multiplicity of said secondary windings including a trigger control winding for generating a control current; and,

(c) switching means being feedback coupled to said induction means for establishing said regulated current, said switching means including regulation means for maintaining said power output of said gas discharge tube at a predetermined and substantially constant value, said regulation means including a toroidal transformer having (1) a first winding coupled in series relation with said trigger control winding and said switching means for modifying said control current, and, (2) a second winding coupled to said tapped primary winding of said induction means and said filter means in series relation for feedback to said first winding of said toroidal transformer.

4,587,462

FLUORESCENT LIGHT SOURCE WITH PARALLEL DC DISCHARGES

Carl F. Buhrer, Framingham, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 10, 1984, Ser. No. 639,916

Int. Cl.[4] H05B *41/16, 41/24*

U.S. Cl. 315—260 **15 Claims**

1. A lamp in which a gas is electrically discharged to produce light comprising:

a. a cylindrical envelope closed at both ends and having a coating of light emitting material on an inner surface and containing a gas;

b. a plurality of semi-circular partitions extending along a major longitudinal axis of said envelope and having light emitting coating on inner concave surfaces;

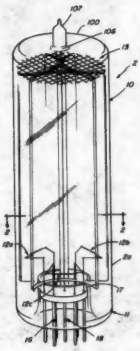
c. a plurality of electrodes, one each of such electrodes being located at one end of said partitions, said electrodes being electrically coupled to leads extending exterior to said envelope;

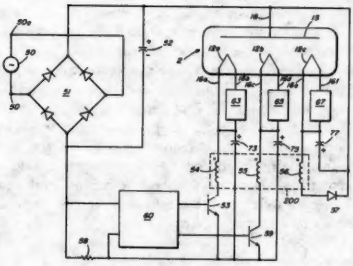
d. a single electrode adjacent to an end of said partitions opposite the end at which the plurality of electrodes are located and extending over all partitions and having a lead extending exterior to said envelope; and

e. inactive regions between the outer surfaces of said partitions and the inner surface of said envelope and extending along the major longitudinal axis thereof in which no gaseous discharge occurs forming a flow back path between oppositely disposed electrodes for gas moved along the discharge path by current flow between electrodes.

11. A ballast power supply for a plural path discharge fluorescent lamp having a switching cycle of fixed time in which at least three heated cathodes are provided opposite a single anode comprising:

a. first and second inductors separately electrically coupled to one of two of the cathodes and forming the primary windings of a transformer;





b. the secondary of said transformer being formed by a third inductor electrically coupled to the third cathode;

c. each of said inductors sharing a common magnetic core;

d. a charging capacitor coupled on one side to said third inductor and on the remaining side to said anode.

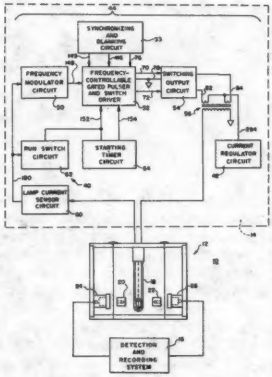
e. switching means for enabling current to flow through the first inductor for a first one-third of said cycle, whereby a magnetic field is established in said core, and for the next one-sixth of the cycle discharging the magnetic field in said core which induces a voltage across the third inductor thereby charging the charging capacitor and for a second one-third of switching current through the second inductor to store magnetic energy in the transformer core and on the remaining one-sixth of the cycle discharging said magnetic energy to again charge said charging capacitor.

4,587,463

ABSORBANCE MONITOR

Robert W. Allington, Lincoln, Nebr., assignor to Isco, Inc., Lincoln, Nebr.

Filed Sep. 22, 1983, Ser. No. 534,581
Int. Cl.[4] H05B *41/36*
U.S. Cl. 315—307 **22 Claims**



1. Apparatus comprising:

a lamp transformer;

said lamp transformer having a primary and secondary winding;

said lamp transformer having sufficiently high inductance and low loss to store energy capable of creating a pulse of at least 1,000 volts amplitude with a pulse width of at least 10 microseconds across a resistance of at least 20 kiloohms in the secondary of the lamp transformer from an average current flowing through the primary corresponding to an input power load of less than five times the normal operating power;

means adapted to connect the secondary winding of said lamp transformer in circuit with a lamp;

means for sensing current through said lamp;

means for applying pulses at a comparatively low frequency to the primary of said transformer under the control of said means for sensing current;

said means for applying pulses including means for open-circuiting said primary after a current pulse has been applied, whereby a high potential spike is applied across said lamp to cause it to start;

means for increasing the frequency of said pulses as said current increases up to a first predetermined value during a first period of time;

means for limiting said current to said first predetermined value;

means for timing said first period of time until said current reaches said predetermined value;

means for terminating said pulses when time is exceeded unless said current has reached a second predetermined value that may be less or the same as the said first predetermined value;

means for applying short blanking pulses to interrupt said pulses applied to the primary of said transformer; and

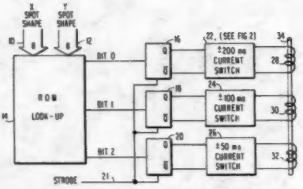
timing means for preventing the application of said blanking pulses for a second period of time for at least two seconds from the beginning of said application of pulses to said transformer.

4,587,464

ELECTRON BEAM CONTROL SYSTEM

Cecil T. Ho, Poughkeepsie, and John G. Wilman, Hopewell Junction, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 29, 1984, Ser. No. 626,357
Int. Cl.[4] H01J *29/58*
U.S. Cl. 315—382 **7 Claims**



1. An elecrron beam cross section control comprising:

a digital to analog converter receiving digital signals indicative of electron beam spot size; n registers each storing a bit of a digital shape value; n current drivers coupled to respective ones of said n registers, each of said n current drivers providing a current that is proportional to the weighted value of the associated bit; and

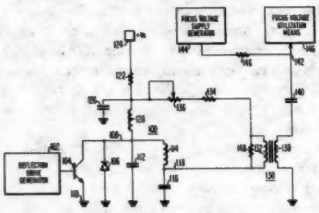
n coils coupled to respective ones of said n current drivers, all of said n coils being wound on a common bobbin.

4,587,465

DYNAMIC FOCUS CIRCUIT

Walter Truskalo, Hopewell Township, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Nov. 30, 1984, Ser. No. 676,816
Int. Cl.[4] H01J *29/58*
U.S. Cl. 315—382 **13 Claims**



1. In a television deflection circuit including direct current (DC) power supply means, and further including, in parallel combination, a switching transistor, a damper diode, a retrace capacitor and a deflection winding coupled in series with a DC blocking capacitor, and wherein inductance means is coupled between said DC power supply means and said parallel combination for supplying a DC operating potential thereto, such that the average DC potential at the point of series coupling of said deflection winding and said DC blocking capacitor is substantially the same as said operating potential, a focus voltage generating arrangement having scan rate modulation of the focus voltage, comprising:

focus supply means for providing a first focus voltage;

transformer means for coupling signals between primary and secondary windings having substantial DC isolation therebetween, one end of said primary winding being coupled to the point of said series coupling of said deflection winding and said DC blocking capacitor and the other end of said primary winding being coupled to said DC power supply means such that the average DC potential at each end of said primary winding is substantially the same as said operating potential; and

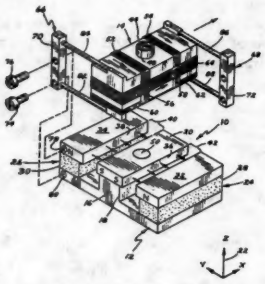
signal combining means coupled to said focus supply means and to said secondary winding for providing a second focus voltage having scan rate modulation.

4,587,466

TWO AXIS LINEAR MOTOR FOR OPTICAL FOCUSING AND TRACKING SYSTEM IN OPTICAL RECORDING

Thomas E. Berg, Colorado Springs, and Christopher A. Pollard, Monument, both of Colo., assignors to Magnetic Peripherals, Minneapolis, Minn.

Filed Dec. 9, 1982, Ser. No. 448,130
Int. Cl.[4] H02K *41/02*
U.S. Cl. 318—38 **34 Claims**



1. A two axis linear motor comprising:

a magnet structure having at least two high energy permanent magnets and an elongated central pole piece and a pair of elongated side pole pieces disposed parallel and adjacent to said central pole piece in the elongated direction to create a pair of magnetic flux gaps with respect to said central magnet pole piece,

an armature structure adapted to fit over and around said central pole piece, said armature structure having a first coil winding means disposed in a first coordinate reference plane in said pair of magnetic flux gaps and a second coil winding means in a second and different coordinate reference plane in said pair of magnetic flux gaps, and

a suspension flexure structure means for mounting said armature structure to said magnet structure for movement in two directions, the first direction perpendicular to said first coordinate reference plane and the second direction perpendicular to said second reference plane, said suspension flexure structure means supporting said armature structure against undesired rotations and translations while allowing the first and second movements with respect to said magnet structure.

4,587,467

SYSTEM FOR ORIENTING A ROTATING MEMBER

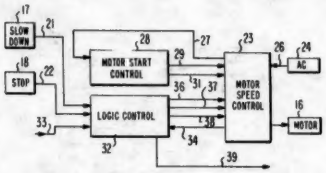
Bruce A. Breiner, Lititz, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Mar. 14, 1985, Ser. No. 711,724
Int. Cl.[4] H02P *3/08*
U.S. Cl. 318—272 **10 Claims**

1. A system for accurately orienting a member rotated by a motor in a desired orientation, said motor being responsive to a motor speed control means whereby said motor is controlled by said system through said motor speed control means, said system comprising:

a slow down sensor and a stop sensor located in spaced relation to said member, actuating means arranged on said rotated member for passing in close proximity to said sensors whereby said slow down sensor and said stop sensor sequentially provide slow down and stop signals to a logic control means,

said logic control means actuating said motor speed control means in response to said slow down and said stop signals whereby said motor is responsive to said slow down and said sensors; and



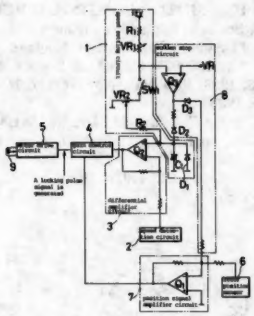
motor start control means responsive to said motor speed control means for delaying rotation of said motor for a predetermined time after said system is voltage actuated.

4,587,468

SUDDEN STOP CIRCUIT FOR A BRUSHLESS MICROMOTOR

Toshihiro Hotta, Uji, Japan, assignor to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan

Filed Jan. 18, 1985, Ser. No. 692,832
Claims priority, application Japan, Jan. 25, 1984, 59-8911[U]
Int. Cl.⁴ H02P *3/00*
U.S. Cl. 318—362 **1 Claim**



1. A sudden stop circuit for a brushless micromotor comprising a means for detecting the off state of an on/off switch of said brushless micromotor and a means for applying a locking pulse signal to at least one motor coil for a specified period depending on the off state detection signal generated by said detection means, said means for applying a locking pulse signal comprising a capacitor which is discharged when the off state of said on/off switch is detected by said detection means and said locking pulse signal having a voltage level corresponding to the discharge voltage of said capacitor is generated and applied to at least one motor coil via a brushless motor drive circuit by said means for applying a locking pulse signal, whereby said motor rotor is braked by the electromagnetic force generated in said motor coil by said locking pulse signal.

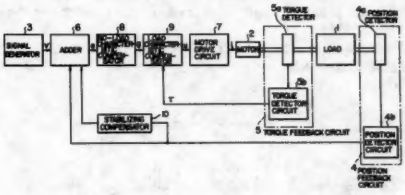
4,587,469

ELECTRIC SERVO SYSTEM

Yo Ikebe, Tokyo, and Hiromu Hirai, Ibaraki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 10, 1982, Ser. No. 416,626
Claims priority, application Japan, Sep. 14, 1981, 56-143865
Int. Cl.⁴ H02P *7/00*
U.S. Cl. 318—432 **10 Claims**

1. In a position electric servo system including electrical drive means, a controllable object driven by the electrical drive means and acting as a load, signal generator means for generating a position target value signal for the load, position detector means for detecting a position of the load and for providing a position signal indicative thereof, means for calculating an error between the position target value signal from the signal generator means and the position signal from the position detector means and for providing an error signal indicative thereof, and drive circuit means responsive to the error signal for providing an amplified input signal to the electrical drive means, the improvement comprising: compen-



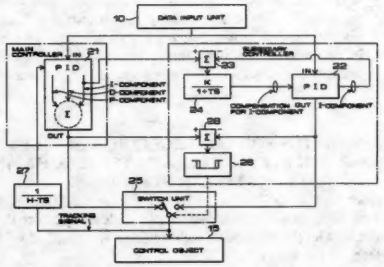
sator means conneted between the error calculating means and the drive circuit means for compensating load characteristics of the controllable object so that an output of the electrical drive means for driving the controllable object is substantially independent of torque of the load, the load characteristic compensator means positively feeding back to the electrical drive means an electrical signal indicative of the load torque through a series compensation means for enabling the output of the electrical drive means to be substantially independent of the load torque.

4,587,470

MULTIPLEX CONTROL SYSTEM

Masahiko Yamawaki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1984, Ser. No. 661,948
Claims priority, application Japan, Oct. 18, 1983, 58-196576
Int. Cl.⁴ G05B *9/03*
U.S. Cl. 318—564 **2 Claims**



1. A multiplex control system including a main controller and subsidiary controller with different control characteristics connected through a switch unit to a control object, said main controller comprising an analog circuit and said subsidiary controller comprising a digital circuit, each of said main and subsidiary controllers comprising a PID operator for calculating proportional, differential and integral components;

said system including a compensation means for eliminating output error caused by differences of the control characteristics between said main controller and said subsidiary controller; and

said compensation means being so arranged that the integral term of said PID operator of said main controller is pro-

cessed through a time lag operator of first order and added to the integral term of said PID operator of said subsidiary controller thereby to compensate an output error.

4,587,471

HANDLE ASSEMBLY FOR AN X-RAY EXAMINATION APPARATUS

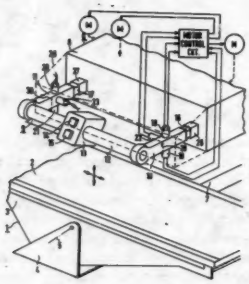
Norbert Barthelmes, Erlangen, and Werner Woelfel, Hessdorf, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jul. 12, 1983, Ser. No. 513,015

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1982, 3236116

Int. Cl.⁴ G05B *11/01*

U.S. Cl. 318—628 **9 Claims**



1. A handle assembly for moving a heavy component with the aid of a motive means drivingly connected to said component and having control circuitry for controlling the operation of said motive means, said handle assembly comprising:

a support means rigidly connecting said assembly to said component, said support means having at least one defined mechanically weak point; and

a plurality of control assemblies electrically connected to said control circuitry and mechanically connected between said support means and said component spanning said weak point, said control assemblies each generating an electric signal for use by said control circuitry for operating said motive means for moving said component in response to deformation exhibited by said weak point upon the application of force to said handle assembly.

4,587,472

APPARATUS FOR CONTROLLING A MAGNET IN A MAGNETICALLY SUSPENDED VEHICLE HAVING A LINEAR STATOR

Günter Steinmetz, Train, and Gerhard Bohn, Munich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

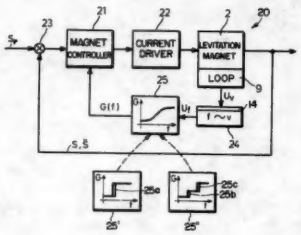
Filed Mar. 25, 1985, Ser. No. 715,495

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1984, 3411190

Int. Cl.⁴ G05B *11/00*

U.S. Cl. 318—687 **9 Claims**

1. An apparatus for controlling the force of a levitation magnet in a magnetically levitated vehicle having a linear stator, comprising a uniformly toothed rail track with teeth each having a determined width in the travel direction, levitation magnets having pole pieces with surfaces facing said rail track teeth, a groove in said pole piece surface, an induction conductor loop in said groove, said induction conductor loop including output terminals, said conductor loop having a loop width in the travel direction corresponding to said determined width of said track teeth for inducing in said conductor loop an alternating signal having a frequency proportional to the vehicle speed on said track, levitation magnet control circuit means operatively connected to said levitation magnets for energizing said carrier magnets, signal processing circuit means operatively connected to said output terminals of said conductor



loop for receiving said alternating signal to produce a control signal representing the vehicle speed, and feed back means connecting an output of said signal processing circuit means to said magnet control circuit means for controlling the magnet force in response to said control signal.

4,587,473

STEPPER MOTOR CONTROL CIRCUIT

Simon Turvey, Solihull, England, assignor to Lucas Industries public limited company, Birmingham, England

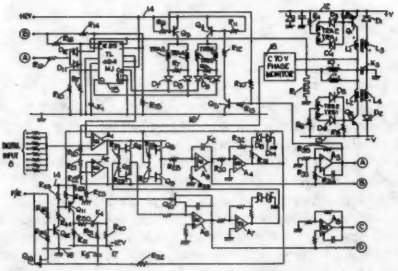
PCT No. PCT/GB83/00027, § 371 Date Sep. 28, 1983, § 102(e) Date Sep. 28, 1983, PCT Pub. No. WO83/02695, PCT Pub. Date Aug. 4, 1983

PCT Filed Feb. 2, 1983, Ser. No. 541,344

Claims priority, application United Kingdom, Feb. 2, 1982, 8202913

Int. Cl.⁴ H02K *29/04*

U.S. Cl. 318—696 **15 Claims**

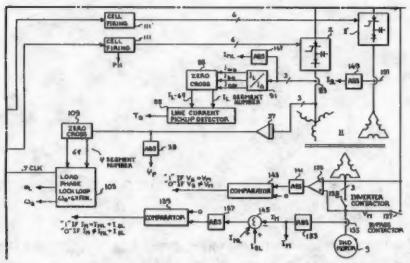


1. A stepper motor control circuit responsive to a variable step rate demand signal, said circuit comprising a waveform generator circuit arranged to generate a pair of substantially stepless symmetrical periodic waveforms of constant amplitude and of frequency determined by said variable step rate demand signal received thereby, the waveforms being 90° out of phase, a pair of pulse width modulation circuits arranged to drive the motor windings, each modulation circuit receiving one of said waveforms as a current demand signal and a feedback signal related to the instantaneous current in the associated ones of the motor windings, wherein said waveform generator circuit is a triangular waveform generator circuit in which the slopes of the leading and trailing flanks of the waveform are equal during steady speed running of the motor.

4,587,474
CONTROL FOR BUMPLESS TRANSFER OF AN AC MOTOR BETWEEN A SOLID-STATE INVERTER AND A SUPPLY MAINS

Paul M. Espelage, Salem, Va.; David L. Lippitt, Scotia, N.Y., and James M. Nowak, Roanoke, Va., assignors to General Electric Company, Salem, Va.

Filed Jul. 2, 1984, Ser. No. 626,712
Int. Cl.⁴ H02P 1/28, 1/30
U.S. Cl. 318—709 **3 Claims**



1. In a motor control system of the type in which an AC motor is selectively furnished with electrical power (voltage and current) directly from supply mains and from a power conditioner connected between the supply mains and the motor, said power conditioner including a source converter and a load converter each including controllable switches and each response to a respective phase-locked loop acting through motor speed and motor torque control loops to control the conductive states of the converter switches and thereby the operation state of the motor, a method of transfering the motor between being supplied with power from said supply mains being supplied with power from said power conditioner comparing the steps:

(a) coupling the power conditioner to the supply mains and to the motor without rendering conductive the switches of said power converter;

(b) allowing each of said phase-locked loops to reach a stable state of operation;

(c) disabling the speed control loop;

(d) determining the motor current and providing a current feedback signal representative thereof;

(e) applying said current feedback signal to the torque control loop to develop a torque command;

(f) controlling the source converter in response to the torque command, to achieve the same value current as the motor current;

(g) controlling the load side converter in response to the torque command to control the angle of rendering its controllable switches conductive;

(h) comparing the current supplied to the motor by the power conditioner to the current of the motor;

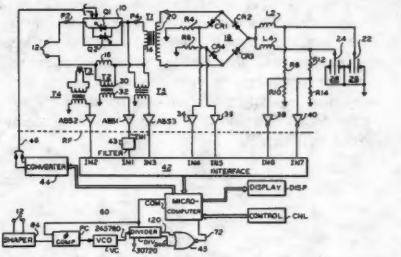
(i) disconnecting the supply mains from the motor when the current supplied by the power conditioner and the current in the motor are approximately equal; and

(j) activating the power conditioner speed control loop at the same time the supply mains are disconnected with the speed regulator output initialized to the value of current presently being supplied.

4,587,475
MODULATED POWER SUPPLY FOR AN ELECTROSTATIC PRECIPITATOR

James A. Finney, Jr., Whippany, and Frank Gallo, Wanaque, both of N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Jul. 25, 1983, Ser. No. 517,107
Int. Cl.⁴ B03C 3/68
U.S. Cl. 323—241 **14 Claims**



1. In an electrostatic precipitator system powered by a primary power source, a power supply comprising:

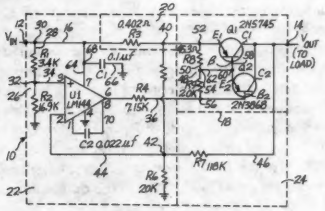
a power means adapted to be coupled to said primary power source for producing a converted voltage with a frequency content different from that of said primary power source, said power means being operable to draw from said primary power source current that cycles at a central frequency; and

a high voltage means coupled to and driven by said power means for producing from its converted voltage a high voltage having a nonaltering, high voltage component, said high voltage being influenced by said frequency content, said content of said converted voltage produced from said power means having at least one steady state frequency component lower in frequency than said central frequency at said power means for driving said high voltage means, said steady state component being sized to allow efficient precipitation.

4,587,476
HIGH VOLTAGE TEMPERATURE COMPENSATED FOLDBACK CIRCUIT

Glen P. Cushman, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 29, 1983, Ser. No. 537,729
Int. Cl.⁴ G05F 1/58, 1/44
U.S. Cl. 323—276 **18 Claims**



1. A foldback circuit, comprising:

a first conductor path including in series, an input terminal connectable to a direct current power supply, shutoff circuitry including transistor means, and an output terminal connectable to a load; and

control circuitry for the shutoff circuitry including an opera-

tional amplifier connected to operate the shutoff circuitry in response to a load demand which exceeds a current pass limit, to decrease the base current of the transistor means and cause the output current to foldback, said operational amplifier including a +V terminal connected to input voltage, a −V terminal connected to ground, an output terminal connected to the base of the transistor means, a noninverting input terminal, means powered by the input voltage and connected to provide a reference voltage at the noninverting input terminal which is less than but varies directly with the input voltage, an inverting input terminal, a conductor extending from a point in the first conductor path ahead of the shutoff circuitry to the inverting input terminal, and a foldback conductor extending from a point in the first conductor path between the shutoff circuitry and the output terminal to the inverting input terminal.

4,587,477

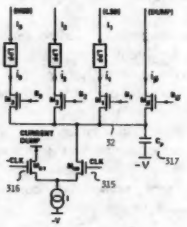
BINARY SCALED CURRENT ARRAY SOURCE FOR DIGITAL TO ANALOG CONVERTERS

Thomas Hornak, Portola Valley; Gary L. Baldwin, Palo Alto, and Ronald W. Potter, Saratoga, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 18, 1984, Ser. No. 611,803

Int. Cl.⁴ G05F *3/16*

U.S. Cl. 323—312 **1 Claim**



1. A binary scaled current source comprising:

a set of n switches $M_1, \ldots, M_n$, referred to herein as binary switches, each having an output and each having an input connected in parallel with the inputs of the other binary switches to a common input, each of said binary switches being responsive to an associated control signal, the control signal for the kth switch M_k being designated as B_k;

a dc current source connected to the common input of the binary switches to supply a current I to the binary switches;

control signal means, connected to the switches M_k, for generating the control signals B_k so that at any given time one and only one of the control signals is high and so that the fraction of time that control signal B_k is high (referred to herein as the duty cycle of B_k) is equal to 2^{k-1} times the duty cycle of B_1, thereby producing through the kth switch M_k (for k=1, . . . ,n) a current i_k that has a dc component I_k that is 2^{k-1} times the dc component I_1 of i; and

pulse means, connected between said dc current source and said common input, for providing to the common input a pulsed current I_p which consists of a periodic sequence of pulses of amplitude I, the timing of the transitions in the control signals B_k and the pulsed current source being such that no transition in any of the control signals B_k occur during any of the current pulses.

4,587,478

TEMPERATURE-COMPENSATED CURRENT SOURCE HAVING CURRENT AND VOLTAGE STABILIZING CIRCUITS

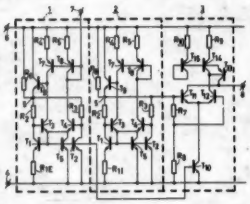
Wolfdietrich G. Kasperkovitz, and Dirk J. Dullemond, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 13, 1984, Ser. No. 589,244

Claims priority, application Netherlands, Mar. 31, 1983, 8301138

Int. Cl.⁴ G05F *1/46*

U.S. Cl. 323—316 **3 Claims**



1. A temperature-compensated current source arrangement for generating an output current which is substantially temperature-independent or has a negative temperature dependence, which comprises:

a current-stabilizing circuit for generating a current having a positive temperature dependence;

a voltage-stabilizing circuit for generating a temperature-independent voltage; and

an amplifier having a temperature-compensated current output terminal, said amplifier comprising first and second bipolar transistors arranged as a differential pair having a common emitter connection and two base connections, said current from said current-stabilizing circuit being coupled to said common emitter connection and at least a fraction of said voltage from said voltage-stabilizing circuit being applied between said two base connections, said current output terminal being connected to a collector of one of said transistors of the differential pair.

4,587,479

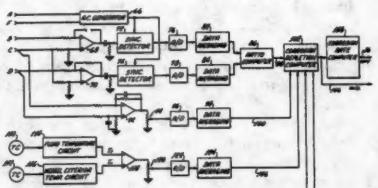
CORROSION MEASUREMENT WITH MULTIPLE COMPENSATION

Rex V. Rhoades, Anaheim, and Charles M. Finley, Arcadia, both of Calif., assignors to Rohrback Corporation, Seattle, Wash.

Filed Jul. 16, 1984, Ser. No. 631,197

Int. Cl.⁴ G01R *27/02*

U.S. Cl. 324—65 CR **33 Claims**



1. In an electrical resistance-type corrosion measurement system, having test and reference elements mounted in a probe adapted to be placed in a fluid environment of which corrosive

characteristics are to be measured, and having means for providing a corrosion signal representing corrosion of said test element, said signal having a compensation for temperature of said environment, the improvement comprising apparatus for further compensating said signal for fluctuation of an environment variable that affects said corrosion signal, said variable comprising the temperature gradient between said environment and a point adjacent the probe outside said environment, said apparatus comprising

means responsive to said environment variable for measuring said variable and generating an auxiliary compensation signal representing the value of such variable, and

means for combining the corrosion signal with said auxiliary compensation signal to provide an output signal representative of corrosion of said test element compensated for variation of said variable.

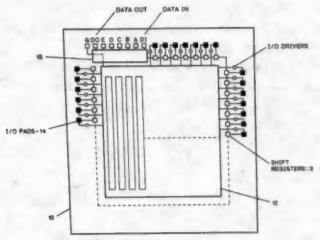
4,587,480
DELAY TESTING METHOD FOR CMOS LSI AND VLSI INTEGRATED CIRCUITS

John J. Zasio, Sunnyvale, Calif., assignor to Storage Technology Partners, Louisville, Colo.

Division of Ser. No. 389,573, Jun. 17, 1982, Pat. No. 4,495,628. This application Jun. 20, 1984, Ser. No. 622,428

Int. Cl.[4] G01R *15/12*

U.S. Cl. 324—73 R **3 Claims**



1. A method of performing delay testing of CMOS LSI or VLSI integrated circuits comprising the steps of:

(a) realizing a shift register circuit having a large number of serially connected stages as part of the LSI/VLSI CMOS circuitry;

(b) realizing a shift register control circuit as part of the LSI/VLSI CMOS circuitry that controls the operation of said shift register circuit and allows the shift register circuit to operate in at least one of two modes, a first mode of which permits data signals to be controllably clocked through the shift register stages, and a second mode of which allows the shift register to operate as a ring oscillator and permits data signals to propagate through the shift register stages at a speed limited only by the inherent propagation delay times associated with each shift register stage;

(c) including logic combinational circuitry as part of said LSI/VLSI circuitry that selectively allows said shift register circuit to be configured as a ring oscillator in response to control signals generated by said shift register control circuit;

(d) placing input/output pads around the periphery of said LSI/VLSI CMOS circuitry through which data signals and control signals may be sent to or received from the shift register circuit, control circuit, and other circuitry forming part of said LSI/VLSI circuitry;

(e) sending appropriate control signals to said shift register control circuit to cause said shift register circuit to assume its second mode of operation;

(f) injecting a data signal into a first stage to said shift register circuit through one of said input/output pads; and

(g) measuring the period of oscillation associated with said ring oscillator, said period of oscillation being related to the delay time it takes said data signal to propagate through the stages of said shift register circuit.

4,587,481
ARRANGEMENT FOR TESTING MICRO INTERCONNECTIONS AND A METHOD FOR OPERATING THE SAME

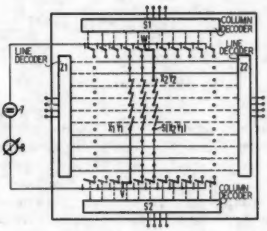
Burkhard Lischke, Munich; Jürgen Frosien, Ottobrunn, and Reinhold Schmitt, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 16, 1983, Ser. No. 504,742

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1982, 3235119

Int. Cl.[4] G01R *15/12*

U.S. Cl. 324—73 PC **12 Claims**



1. An arrangement for electrically testing micro-interconnections having a predetermined geometric arrangement, comprising:

a test member including a surface and a planar contact structure comprising a plurality of test contacts carried at said surface for electrically contacting respective points of the microinterconnections, said test contacts arranged in said predetermined geometrical arrangement;

a plurality of selectively operable switch means embedded in said member and each connected to a respective test contact, selective operation of a pair of said switch means defining an electrical path to be tested;

conductors embedded in said member for carrying test voltages for said test contacts and connected to said plurality of switches; and

a series circuit including a d.c. voltage source and a current measuring device connected in series with said plurality of switch means to provide and measure current flow through a selectively defined current path.

4,587,482
DIGITAL FREQUENCY METER FOR MEASURING RADIATION

Masakoto Hasegawa, Ono, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 2, 1983, Ser. No. 519,733

Int. Cl.[4] G01R *23/02*

U.S. Cl. 324—78 D **2 Claims**

1. A digital frequency meter for measuring frequencies of radiation pulses comprising:

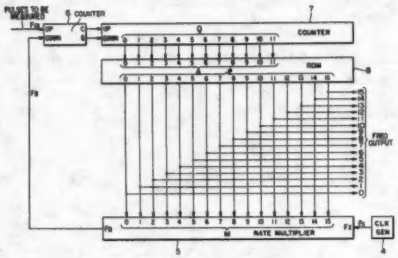
(a) a first up/down counter means having an up input connected to receive said radiation pulses and a down input converted to receive feedback pulses and producing outputs representing the integrated differences between frequencies of said radiation pulses and frequencies of said feedback pulses;

(b) a second up/down counter means having an up input and a down input connected in cascade to receive the outputs of said first up/down counter means, and generating outputs representing the integrated differences therebetween;

(c) arithmetic circuit means connected to receive said outputs of said second up/down counter means, and producing outputs proportional thereto;

(d) frequency generator circuit means connected to receive the outputs of said arithmetic circuit means and generating feedback pulses having frequencies proportional to said arithmetic circuit means outputs;

(e) connections for transmitting said feedback pulses to said down input of said first up/down counter means; and



(f) said first and second counter means, arithmetic circuit means and frequency generator circuit means forming a closed loop for equalizing said frequencies of said radiation pulses and said frequencies of said feedback pulses and providing a frequency meter time constant which is inversely proportional to said frequencies of said radiation pulses and a constant product between said frequencies of said radiation pulses and said time constant of said meter.

4,587,483

MEASUREMENT OF ELAPSED TIME FOR A PREDETERMINED FREQUENCY SHIFT

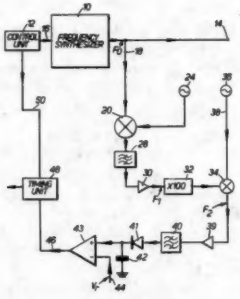
Peter P. R. Connell, Marlow, and Michael Yeomans, Maidenhead, both of England, assignors to RACAL-DANA Instruments, Ltd., Berkshire, England

Filed Sep. 26, 1983, Ser. No. 535,819

Claims priority, application United Kingdom, Oct. 1, 1982, 8228102

Int. Cl.⁴ G01R *23/14*

U.S. Cl. 324—79 R **7 Claims**



1. A method of determining the time instant when a changing frequency changing towards a new frequency value differs by not more than a predetermined amount from the new value, comprising the steps of

multiplying the said changing frequency by a predetermined multiplication factor,

generating a reference frequency which is the sum of (a) a predetermined frequency and (b) the said new frequency value multiplied by the predetermined factor,

subtracting the product resulting from the multiplication step from the reference frequency so as to produce an output frequency whose value differs from the predetermined frequency by an amount which corresponds to the amount by which the said changing frequency differs from the new frequency value multiplied by the predetermined factor,

measuring the difference between the output frequency and the predetermined frequency as the said changing frequency changes towards the new frequency value and thus changes the output frequency towards the predetermined frequency, and

determining the time instant when the output frequency differs from the predetermined frequency by not more than the predetermined amount multiplied by the predetermined factor.

4,587,484

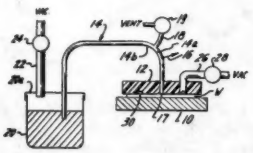
MERCURY PROBE AND METHOD

Carl Shulman, Edgewater, N.J., assignor to MSI Electronics Inc., New York, N.Y.

Continuation-in-part of Ser. No. 226,357, Jan. 19, 1981, abandoned. This application Oct. 12, 1983, Ser. No. 541,046

Int. Cl.⁴ G01R *1/06;* H01R *3/00*

U.S. Cl. 324—158 F **6 Claims**



1. The method of operating mercury probe apparatus of the type having at least one contact aperture in an aperture plate for engagement with a test wafer, a mercury reservoir at an elevation at least largely below the contact aperture, and passage means between said aperture and the reservoir, the passage means having an opening into the reservoir below the upper surface of the mercury therein, the contact aperture being related to said upper surface of the mercury so that the mercury is normally retracted from the contact aperture, said method including the steps of applying a pressure difference between the contact aperture and the upper surface of the mercury in the reservoir for thereby shifting mercury to the contact aperture to form at least one mercury probe contact, electrically testing the wafer, and then causing mercury to descend in the passage means solely by establishing sustained equality of pressure at the contact aperture and at the upper surface of the mercury in the reservoir, said method including the further step of adjusting the relative levels of the upper surface of the mercury in the reservoir and said opening of the passage means into the reservoir so that said opening is immersed no deeper than about the level at which the gravitational force of the mercury in the reservoir at said opening tending to cause mercury to enter the passage means is balanced by the reverse effect of the surface tension of the mercury across said opening, for causing said passage means to be essentially self-emptying.

4,587,485

EVALUATION ARRANGEMENT FOR A DIGITAL INCREMENTAL TRANSMITTER

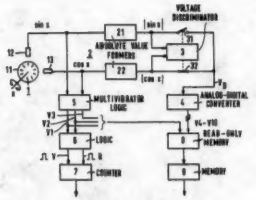
Wolfgang Papiernik, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 2, 1983, Ser. No. 519,579

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1982, 3231990

Int. Cl.[4] G01P *3/44, 13/00*

U.S. Cl. 324—166 6 Claims



1. An evaluation arrangement for a digital incremental transmitter of the type having first and second transmitter outputs for producing respective sinusoidal voltages of equal amplitude which are shifted in phase by 90° with respect to one another, the evaluation arrangement further having a converter for converting the sinusoidal voltages of the first and second transmitter outputs into a measurement signal corresponding proportionally to the count of the periods of the sinusoidal voltages produced, the evaluation arrangement further comprising;

means for producing a periodic triangular voltage having a fundamental frequency which is an integral multiple of the frequency of the sinusoidal voltages in response to an interlinking of linear portions of the sinusoidal voltages;

converter means for converting said triangular voltage into corresponding digital values;

logic means for producing digital logic signals which are derived from the sinusoidal voltages and whose state combinations correspond one to one to the circular segments of the sinusoidal voltages within a period; and

memory means for storing a plurality of corresponding absolute values of the sinusoidal voltages within a period, said memory means having an output for producing selected one of said absolute values and an input for receiving said digital values and said digital logic signals, said absolute values being selected in response to said digital values and said digital logic signals so as to establish the actual position value within a period of the sinusoidal voltages.

4,587,486

SWITCH FOR DETECTING A MAGNETIC FIELD

Gerno Soyck, Halver, Fed. Rep. of Germany, assignor to Werner Turck GmbH & Co., KG, Halver, Fed. Rep. of Germany

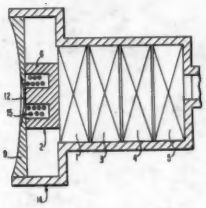
Filed Nov. 30, 1982, Ser. No. 445,670

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1981, 3148496; Dec. 8, 1981, 3148529; Dec. 8, 1981, 3148575

Int. Cl.[4] G01N *27/72;* G01R *33/12;* G01B *7/14;* H01F *7/06*

U.S. Cl. 324—236 7 Claims

1. A magnetic-field-dependent inductive proximity switch, comprising a core which is saturation-sensitive to a magnetic field to be detected, a high-frequency oscillator circuit having an oscillator coil for producing an electromagnetic oscillatory field in said core, and an electronic analyzing circuit coupled to said oscillator for detecting detuning of said oscillator due to saturation of said core and for triggering a switching process in response to said detecting at a certain core saturation characterized in that the core comprises a closed ferrite core which completely surrounds said oscillator coil so that a magnetic field produced in the magnetic core material of said core by said oscillator circuit is completely enclosed, and said core



having an especially saturation-sensitive narrowed cross section at at least one point.

4,587,487

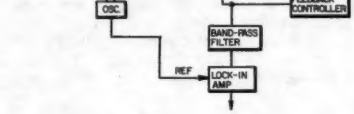
OPTICAL FIBER MAGNETOMETER FOR MEASURING D.C. AND LOW FREQUENCY FIELDS

Paul Zanzucchi, Cleveland, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 443,303, Nov. 22, 1982, abandoned. This application Mar. 10, 1983, Ser. No. 474,148

Int. Cl.[4] G01R *33/02;* G02F *1/09*

U.S. Cl. 324—244 26 Claims



1. In a magnetometer having an optical fiber interferometer with first and second arms and a laser beam input coupled to said interferometer for travel through each of said arms, a system for measuring a D.C. to a low frequency ambient magnetic field comprising:

a pair of matched magnetostrictive elements, each of said elements being coupled to a different arm of said interferometer;

means for applying a bias magnetic field to each of said magnetostrictive elements 180° out of phase to provide balanced oscillations; and

means for comparing the laser beam outputs of each of said interferometer arms to develop a signal representative of the ambient magnetic field.

4,587,488

NUCLEAR MAGNETIC RESONANCE METHODS AND APPARATUS

Ian R. Young, Middlesex, England, assignor to Picker International, Limited, Wembley, England

Filed Aug. 3, 1983, Ser. No. 519,832

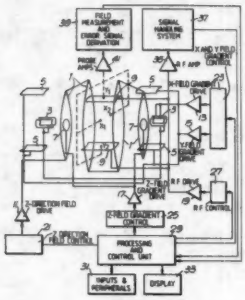
Claims priority, application United Kingdom, Aug. 19, 1982, 8223862

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—306 8 Claims

1. A method of determining the rate of flow of a liquid in a region of a body comprising: first exciting nuclear magnetic resonance selectively in a slice of said body which includes said region; subsequently exciting nuclear magnetic resonance substantially over the whole of said body; waiting a period of

time and then again exciting nuclear magnetic resonance selectively in said slice the time between said first exciting and said again exciting being less than the spin lattice relaxation time for



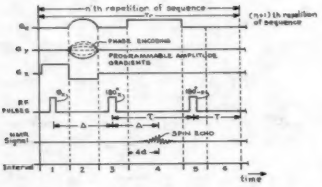
the nuclei excited during said excitations; measuring the subsequent free induction decay signal; and relating said signal to the rate of flow of said liquid through said region.

4,587,489

METHOD FOR RAPID ACQUISITION OF NMR DATA

Felix W. Wehrli, Shorewood, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Oct. 7, 1983, Ser. No. 539,780
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **20 Claims**



1. A method for shortening total NMR data acquisition time, comprising the steps of:

(a) positioning an NMR sample in a homogeneous magnetic field to create in at least a portion thereof a net longitudinal magnetization in a first direction of said homogeneous field, said net longitudinal magnetization having a magnitude M_Z;

(b) irradiating said sample with an RF pulse to convert a fraction but not all, of said net longitudinal magnetization to transverse magnetization;

(c) reversing the direction of dephasing of said transverse magnetization to produce at least one spin-echo signal;

(d) sampling said spin-echo signal to derive, upon analysis, NMR data from said sample; and

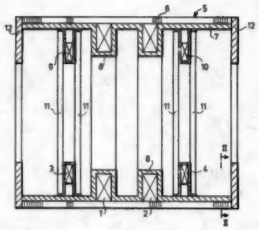
(e) applying along a dimensional axis of said sample a 180° RF pulse to rapidly return to equilibrium along said first direction of said homogeneous field any remaining net longitudinal magnetization inverted to a second direction, opposite to said first direction, during said step of reversing.

4,587,490

ELECTROMAGNET FOR NMR TOMOGRAPHY

Wolfgang Müller, Karlsruhe; Bertold Knüttel, and Günther Laukien, both of Rheinstetten, all of Fed. Rep. of Germany, assignors to Bruker Analytische Messtechnik GmbH, Rheinstetten-Forchheim, Fed. Rep. of Germany

Filed Dec. 8, 1983, Ser. No. 559,869
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1982, 3245944
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—320 **10 Claims**



1. An electromagnet for producing a constant magnetic field as required for use in NMR tomography of a body to be examined, the electromagnet comprising a generally cylindrical ferromagnetic shell,

and a coil system mounted and supported within the ferromagnetic shell for producing a substantially homogeneous magnetic field within the coil system,

such coil system having an axial interior space therein for receiving the body to be examined in such substantially homogeneous magnetic field,

such coil system including an inner pair of Helmholtz double coils,

means for securely supporting the inner pair of Helmholtz double coils within the ferromagnetic shell,

each of said coils having an axial width dimension,

said coils having a radial dimension and an axial spacing dimension center to center therebetween,

the axial width dimension being substantially smaller than the axial spacing dimension,

the axial width dimension also being substantially smaller than the radial dimension,

the coil system including a second, outer pair of Helmholtz double coils having an axial spacing dimension center to center therebetween substantially greater than the axial spacing dimension of the inner pair of Helmholtz double coils,

means securely supporting the outer pair of Helmholtz double coils within the ferromagnetic shell,

such coils of the outer pair having an axial width dimension substantially smaller than the axial spacing dimension between such coils and also substantially smaller than the radius of such coils.

4,587,491

IC CLASS AB AMPLIFIER OUTPUT STAGE

Matsuro Koterasawa, Hachioji, Japan, assignor to National Semiconductor Corporation, Santa Clara, Calif.

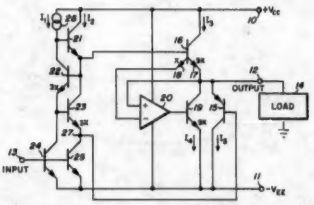
Filed Apr. 29, 1985, Ser. No. 728,554
Int. Cl.[4] H03F *3/26*
U.S. Cl. 330—268 **9 Claims**

1. An integrated output stage circuit having an input and output terminals and first and second power supply terminals connectable to a source of operating power, said circuit comprising:

a source NPN transistor having its emitter coupled to said output terminal, its collector coupled to said first power supply termial and a base;

a source reference NPN transistor having its collector and base terminals coupled to like elements in said source NPN transistor and an emitter;

a sink NPN transistor having its collector coupled to said output terminal, its emitter coupled to said second power supply terminal, and a base;



an operational amplifier having its non-inverting input coupled to said emitter of said source NPN transistor, its inverting input coupled to said emitter of said source reference transistor and its output coupled to said base of said sink NPN transistor; and

signal drive means coupled to said base of said source NPN transistor.

4,587,492

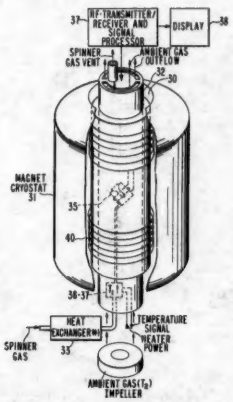
THERMAL BARRIER FOR VARIABLE TEMPERATURE NMR

John R. Laudermilch, Foster City, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Mar. 2, 1984, Ser. No. 585,943

Int. Cl.[4] G01R *33/00*

U.S. Cl. 324—318 **6 Claims**



5. An NMR system for high resolution spectroscopic measurements of a sample at a selectable temperature comprising:

(a) polarizing magnet means for imposing a substantially homogeneous magnetic field throughout the volume occupied by said sample,

(b) fluid impelling means for causing a heat exchanging fluid to flow in heat exchanging relationship with said sample, thermal sensor means for generating a signal proportional to the temperature of said heat exchange fluid in the environs of said sample and heat exchange means for bringing said fluid to a desired temperature,

(c) probe means comprising a probe housing for supporting said sample and for introducing said heat exchange fluid to flow in thermal communication with said sample,

(d) solid thermal barrier means disposed between said flowing heat exchange fluid and said polarizing magnet means for isolating said sample from heat exchange with the environment thereof, said thermal barrier means comprising a thermally non-conducting material.

4,587,493

COIL ARRANGEMENT

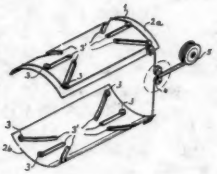
Raimo Sepponen, Helsinki, Finland, assignor to Instrumentarium Oy, Helsinki, Finland

Filed Jul. 1, 1983, Ser. No. 510,350

Claims priority, application Finland, Jul. 7, 1982, 822406

Int. Cl.[4] G01N *27/00*

U.S. Cl. 324—319 **5 Claims**



1. An adjustable signal coil for a nuclear spin or NMR examination assembly, comprising

a flexible conductor,

means for supporting a conductor in a configuration of one or more turns to form a signal coil defining a volume therein to receive a target for examination;

said supporting means including means for adjusting the signal coil to change the coil volume to correspond to different sizes of targets to be examined, and

said adjusting means adjusting the signal coil in such a manner that different magnetic fields of the signal coil in the respective different coil volumes have substantially the same cross-section homogeneity.

4,587,494

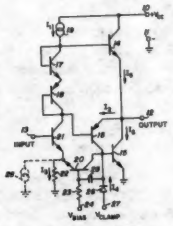
QUASI-COMPLEMENTARY CLASS B IC OUTPUT STAGE

Robert J. Widlar, Jalisco, Mexico, assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jan. 17, 1985, Ser. No. 692,136

Int. Cl.[4] H03F *3/30*

U.S. Cl. 330—273 **4 Claims**



1. A class B integrated circuit output circuit having an input terminal, an output terminal, and first and second supply terminals connectable to a source of operating power, said circuit comprising:

first and second transistor means having a first polarity, each

having a base and having their emitter-collector circuits coupled in series across said first and second supply terminals whereby the juncture of said first and second transistor means comprises said output terminal;

third transistor means having said first polarity with its collector coupled to said base of said second transistor means, its emitter coupled to said second supply terminal and its base coupled to a source of bias potential;

fourth transistor means having said first polarity with its emitter coupled to said emirter of said third transistor means, its collector coupled to said base of said first transistor means, and its base coupled to said circuit input terminal; and

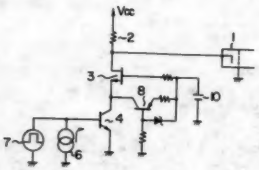
means for forcing said third transistor means to operate as a diode at the higher signal frequencies.

4,587,495

CASCODE AMPLIFIER WITH AN IMPROVED BIASING ARRANGEMENT

Michitaka Osawa; Kunio Ando, and Hitoshi Maekawa, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 19, 1983, Ser. No. 496,257
Claims priority, application Japan, May 21, 1982, 57-84704
Int. Cl.⁴ H03F *3/68, 3/16*
U.S. Cl. 330—311 **5 Claims**



1. A cascode amplifier for driving a cathode ray tube comprising:

a common-gate FET having a drain electrode connected to an electrode of said cathode ray tube and to a first DC voltage source through a load impedance, a gate electrode connected to a second DC voltage source, and a source electrode;

a common-emitter transistor having a base electrode connected to a video signal source, an emitter electrode connected to a common potential, and a collector electrode connected to said source electrode of said FET, the frequency characteristics of said common-emitter transistor being widened in accordance with an increase of a collector current passing therethrough; and

a constant current source connected in parallel to the collector-emitter path of said common emitter transistor for providing an additional collector current through said common-emitter transistor,

wherein said constant current source comprises another transistor having a collector electrode connected to said collector electrode of said common-emitter transistor, an emitter electrode connected to said second DC voltage source, and a base electrode connected to said common potential.

4,587,496

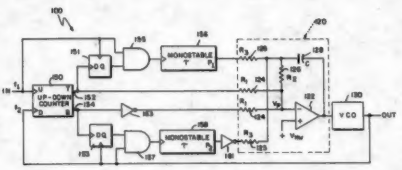
FAST ACQUISITION PHASE-LOCK LOOP

Dan H. Wolaver, Worcester, Mass., assignor to General Signal Corporation, Stamford, Conn.

Filed Sep. 12, 1984, Ser. No. 649,677
Int. Cl.⁴ H03L *7/10;* **H03D** *13/00*
U.S. Cl. 331—1 A **12 Claims**

1. In a phase-locked loop circuit receiving input signals and having means for generating reference signals, loop filter means for controlling said reference signal generating means, and an input stage to drive said loop filter means as a function of said input signals and said reference signals, the improvement being in said input stage and comprising:

up/down counter means for receiving said input signals and said reference signals and producing output signals, representative of the magnitude and polarity of the difference



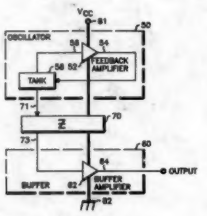
between the frequency of said input signals and the frequency of said reference signals, over an extended range greater than one-half of the frequency of said input signals, said up/down counter means including at least one internal buffer state for use in determining the phase difference between said input signals and said reference signals.

4,587,497

LOW-POWER LOW-HARMONIC TRANSISTOR OSCILLATOR

Anthony F. Keller, Chicago, and Dennis F. Marvin, Roselle, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 24, 1984, Ser. No. 685,424
Int. Cl.⁴ H03B *5/32, 5/36*
U.S. Cl. 331—116 R **14 Claims**



1. A low current oscillator exhibiting a low harmonic output comprising:

frequency determining means for resonating at a predetermined frequency including a resonant tank circuit;

first amplifying means having an input port and an output port coupled to said frequency determining means for providing regenerative feedback to enable oscillation;

second amplifying means having an input port coupled to said frequency determining means and having an output port coupled to a load for providing an amplified oscillation signal; and

impedance transforming means for

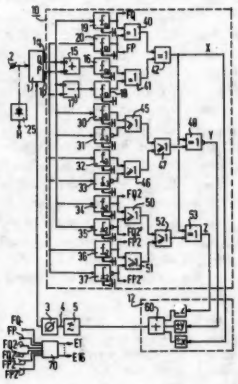
(a) coupling said frequency determining means to said second amplifying means, and for providing the necessary impedance transformation; and

(b) coupling said first amplifying means to said second amplifying means in a totem-pole configuration such that a singular primary direct current path exits through said first and second amplifying means.

4,587,498
CIRCUIT FOR RECOVERING THE CARRIER OF AN AMPLITUDE-AND-PHASE-MODULATED INPUT SIGNAL

Georges Bonnerot, Les Ulis, and Michel Daout, Epinay sur Orge, both of France, assignors to Telecummunications Radioelectriques et Telephoniques T.R.T., Paris, France

Filed Mar. 7, 1984, Ser. No. 587,089
Claims priority, application France, Mar. 7, 1983, 83 03688
Int. Cl.⁴ H03D *3/00*
U.S. Cl. 329—122 **9 Claims**



1. A circuit for recovering the carrier of an amplitude- and-phase-modulated (ASK-PSK) input signal, comprising an oscillator having a frequency control for producing said carrier, a quadrature detector for supp'ying signals representing the amplitude of said input signal projected on two quadrature components P and Q of the carrier signal produced by said oscillator and for thus determining the modulation states of said input signal, and correction means for forming a correction signal for said frequency control of said oscillator on the basis of output signals from a circuit which determines zones in the plane of said quadrature components P and Q, characterized in that said correction means comprises a weighting circuit receiving said output signals from said zone-determining circuit for producing said correction signal in accordance with distinct weights allocated to the respective zones defined by said zone-determining circuit.

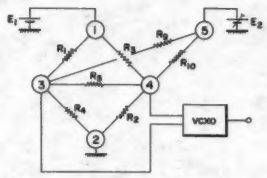
4,587,499
TEMPERATURE COMPENSATING CIRCUIT FOR OSCILLATOR

Takashi Miyayama, Samukawa, Japan, assignor to Toyo Communication Equipment Co., Ltd., Kanagawa, Japan

Filed Jun. 6, 1983, Ser. No. 501,126
Claims priority, application Japan, Jun. 7, 1982, 57-97240; May 10, 1983, 58-82151
Int. Cl.⁴ H03L *1/02*
U.S. Cl. 331—176 **12 Claims**

1. A temperature compensating circuit for a voltage-controlled oscillator wherein a reference voltage from a first voltage source is applied to a first pair of opposing nodes in a basic resistance bridge circuit, said bridge circuit having a resistance component in each branch thereof, a resistance including an input terminal resistance component of said oscillator circuit being connected between a second pair of opposing nodes in said bridge circuit, and a potential difference between said second node pair is supplied as an output voltage to said oscillator;

said compensating circuit being characterized in that a voltage from a second voltage source is applied between said second node pair through respective predetermined resistances, one or more of the resistance components in said branches and said predetermined resistances being a temperature sensitive resistor, and that the circuit components of said bridge and said predetermined resistances have values such that said output voltage to said oscillator at a

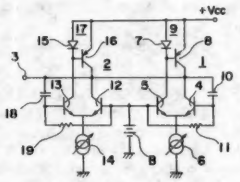


specific reference temperature remains constant regardless of variations in said voltage from said second voltage source and that the output voltage-temperature characteristic of said supplied output voltage compensates for the temperature-frequency characteristic of said oscillator.

4,587,500
VARIABLE REACTANCE CIRCUIT PRODUCING NEGATIVE TO POSITIVE VARYING REACTANCE

Kanji Tanaka, Gunma, and Kazuhisa Ishiguro, Ota, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka and Tokyo Sanyo Electric Co., Ltd., Gunma, both of, Japan

Filed Sep. 23, 1983, Ser. No. 535,962
Claims priority, application Japan, Sep. 27, 1982, 57-169338
Int. Cl.⁴ H03H *11/48, 11/52*
U.S. Cl. 333—213 **7 Claims**



1. A variable reactance circuit comprising a first amplification circuit means for operating as a positive equivalent reactance, a second amplification circuit means for operating as a negative equivalent reactance, an output terminal connected in common to an output of the first and second amplification circuit means, a first control means connected to the first amplification circuit means for generating a first control signal for controlling the first amplification circuit means to vary the positive equivalent reactance value of the first amplification circuit means and a second control means connected to the second amplification circuit means for generating a second control signal for controlling the second amplification circuit means to vary the negative equivalent reactance value of the second amplification circuit means, whereby the equivalent reactance of the variable reactance circuit as seen from the output terminal varies from a negative given value of reactance to a positive given value of reactance.

4,587,501
POLARIZED ELECTROMAGNETIC RELAY

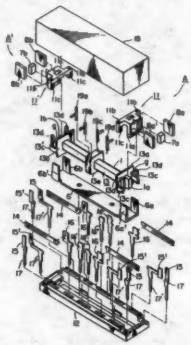
Shunichi Agatahama, Osaka, and Shoichi Yamashita, Nagaokakyo, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 23, 1984, Ser. No. 603,011

Claims priority, application Japan, Apr. 22, 1983, 56-61262[U]

Int. Cl.⁴ H01H *51/22*

U.S. Cl. 335—80 **6 Claims**



1. A polarized electromagnetic relay, comprising:

an elongated yoke having at each end a pair of erect legs widthwise opposing to each other;

a bar-like core extending in parallel with said yoke;

a coil wound on said core; and

a pair of movable armature blocks, each composed of a permanent magnet and a pair of magnetic pole pieces disposed at both ends thereof perpendicularly in the direction of magnetization of said permanent magnet;

wherein each end portion of said core is disposed between said paired erect legs, respectively, to thereby define four working gaps, said pair of the magnetic pole pieces of each movable armature block being disposed between each pair of said working gaps, and each of said armature blocks being slideably supported by guide means disposed on said core.

4,587,502
ELECTROMAGNETIC RELAY

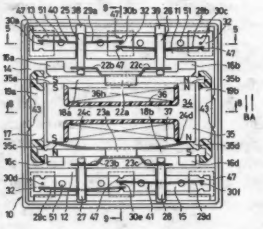
Kenichi Matsuo, and Muneo Nakata, both of Iida, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 23, 1984, Ser. No. 603,013

Claims priority, application Japan, Apr. 23, 1983, 58-61341[U]; Apr. 23, 1983, 58-61343[U]

Int. Cl.⁴ H01H *51/22*

U.S. Cl. 335—85 **11 Claims**



1. An electromagnetic relay comprising:

an electromagnet composed of a core and a coil wound around said core;

at least a contact mechanism disposed at a side of said electromagnet;

a movable armature composed of at least a permanent magnet juxtaposed in parallel with said electromagnet so that both magnetic poles of said permanent magnet are positioned in opposition to both ends of said core, respectively;

a holder frame having erect legs positioned adjacent to both ends of said core, respectively, with said permanent magnet being interposed between said legs and said core;

an actuating member operatively coupled to said permanent magnet for actuating said contact mechanism;

a restoring spring for said movable armature disposed between said permanent magnet and said core;

wherein said core is of an I-like configuration and pairs of relay swithces are disposed at both sides of said electromagnet, respectively, with a first pair of said relay switches being positioned adjacent to one end of said core while a second pair of the relay switches is positioned adjacent to the other end of said core, said movable armature being of a rectangular frame structure constituted by a pair of the permanent magnets extending in parallel with said core, disposed at both sides thereof, respectively, and interconnected by non-magnetic connecting beams, wherein said pair of permanent magnets are so disposed that magnetic poles of opposite polarities face toward one another; and

wherein said holder frame is of an H-like form having four upstanding legs of which two are disposed at one side of said electromagnet with one of said permanent magnets being interposed therebetween while the other two legs are disposed at the other side of the electromagnet with the other permanent magnet being disposed therebetween.

4,587,503
AUXILIARY CONTACT ASSEMBLY FOR MOUNTING ONTO AN ELECTROMAGNETIC SWITCH

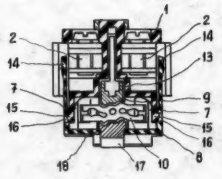
Heinz Suter, Aarau, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed Nov. 15, 1984, Ser. No. 672,112

Claims priority, application Switzerland, Nov. 28, 1983, 6339/83

Int. Cl.⁴ H01H *51/08*

U.S. Cl. 335—135 **2 Claims**



1. An auxiliary contact assembly for mounting onto an electromagnetic switch apparatus including a casing made of a plastic material and encasing a plurality of fixed contacts which are electrically isolated against each other as well as a contact bridge carrier supporting a plurality of contact bridges, in which the casing comprises two sections, the upper section of which comprising laterally open recesses for receipt of the fixed contacts provided with connecting screws and a channel which is open at the bottom and acting as guide of the contact bridge carrier, the lower section of which having a trough-like shape open at the top, which trough has side walls which cover the recesses and points of contact of the fixed ontacts and are provided with narrow projections extending upwards in to the area of the connecting screws and forming a

protection against accidental lateral contact and the bottom of the trough guiding the contact bridge carrier from below, including mounting members and at least one through opening for a coupling element of the contact bridge carrier.

4,587,504

MAGNET ASSEMBLY FOR USE IN NMR APPARATUS

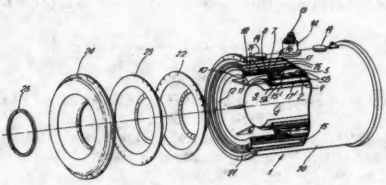
Ian J. Brown; John M. Bird; Ian L. McDougall, and David Black, all of Oxon, Great Britain, assignors to Oxford Magnet Technology Limited, London, England

Filed Nov. 7, 1984, Ser. No. 669,311

Claims priority, application United Kingdom, Nov. 11, 1983, 8330198; Jan. 11, 1984, 8400684

Int. Cl.[4] H01F 7/22

U.S. Cl. 335—216 10 Claims



1. A magnet assembly comprising a first superconducting coil assembly defining a working volume and adapted to generate a first magnetic field in said working volume; and a second superconducting coil assembly adapted to generate a second magnetic field, said second superconducting coil assembly being electrically connected in series with said first superconducting coil assembly, wherein said first and second superconducting coil assemblies are each adapted to generate magnetic fields whose corresponding components are of substantially the same order of magnitude, said assemblies being arranged such that a resultant, uniform magnetic field is generated in said working volume, and said second magnetic field opposes said first magnetic field externally of said magnet assembly.

4,587,505

PLURAL COIL CONNECTION MEANS IN AN ELECTROMAGNETIC DEVICE

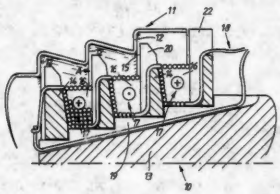
Frank M. Logie, London; George Vine, Barming; Brian J. Tidmarsh, Pinner, and James C. Potter, London, all of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Oct. 16, 1984, Ser. No. 661,786

Claims priority, application United Kingdom, Oct. 22, 1983, 8328306

Int. Cl.[4] H01F 7/08

U.S. Cl. 335—266 6 Claims



1. An electromagnetic device comprising a stator structure and an annular armature surrounding the stator structure, said stator structure defining a plurality of axially spaced circumferential grooves, circumferential pole pieces defined between adjacent grooves respectively, windings in said grooves, said windings being connected in series to form a composite winding the end connections of which extend from one end of the stator structure, each pole piece lying between a pair of grooves having an axial slot in its peripheral surface and one side face of the pole piece being provided with a tangential slot extending from the axial slot to the base wall of the respective groove, said tangential slot extending in the direction appropriate to the winding direction in that groove, the axial and tangential slots acting to accommodate the interconnection between adjacent windings.

4,587,506

SAFETY TRANSFORMER

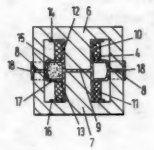
Gerben S. Hoeksma, Winterswijk, Netherlands, assignor to N.V. Nederlandsche Apparatenfabriek NEDAP, De Groenlo, Netherlands

Filed Dec. 17, 1984, Ser. No. 682,199

Claims priority, application Netherlands, Dec. 22, 1983, 8304414

Int. Cl.[4] H01F 17/06, 27/30

U.S. Cl. 336—178 7 Claims



1. An integral one-piece spool for a safety transformer with a low coupling factor, which comprises a first spool portion for supporting a primary winding on the spool, a second spool portion for supporting a secondary winding on the spool, outwardly extending outer flanges adjacent opposite ends of the spool, outwardly extending inner flanges adjacent an inner portion of the spool, each of the outer and inner flanges defining an end of a respective one of the first and second spool portions and the inner flanges being spaced apart to define an isolating space between the first and second spool portions, cup defining portions on opposite sides of the spool, each of the cup-defining portions being integral with at least one of the inner flanges and projecting outwardly therefrom, and each of the cup defining portions including a pair of deep isolating cups for receiving leg end portions of associated transformer core members, with each pair of deep isolating cups being defined by an isolating plate located essentially centrally with respect to the spaced inner flanges and having walls extending from the isolating plate in opposite directions for a distance essentially corresponding at least to a distance defined by the isolating space between the spaced inner flanges.

4,587,507

CORE OF A CHOKE COIL COMPRISED OF AMORPHOUS MAGNETIC ALLOY

Suguru Takayama, Tokyo, and Masao Shigeta, Urayasu, both of Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Nov. 23, 1982, Ser. No. 443,923

Claims priority, application Japan, May 23, 1981, 56-78370

Int. Cl.[4] H01F 17/06

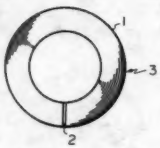
U.S. Cl. 336—178 13 Claims

1. A core of a choke coil which consists of a coiled thin strip of an amorphous alloy, and has at least one cut air gap, the coiled regions of the thin strip being bound to one another at least in the neighborhood of said at least one cut air gap, and said amorphous magnetic alloy contains precipitated fine crystals and consist essentially of the following composition:

$$Fe_xMn_y(Si_pB_qP_rC_s)_z$$

wherein x+y+z is 100 atomic % based on all of the elements,

y is from 0.001 to 10 atomic %, z is from 21 to 25.5 atomic %, p+q+r+s is 1, p is from 0.40 to 0.75, r is from 0.0001 to 0.05,



the ratio s/q is from 0.03 to 0.4, and z is $z \leqq 50p+1$, $z \leqq 10p+19$, $z \geqq 30p+2$, and $z \geqq 13p+13.7$.

4,587,508

BIMETAL SWITCH ASSEMBLY

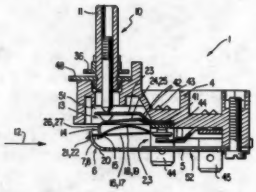
Walter Hollweck, Nuremberg, Fed. Rep. of Germany, assignor to Inter Control Hermann Köhler Elektrik GmbH & Co. KG, Nuremberg, Fed. Rep. of Germany

Filed Nov. 26, 1984, Ser. No. 674,863

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1983, 8334094[U]

Int. Cl.⁴ H01H *37/74*

U.S. Cl. 337—343 **7 Claims**



1. In a bimetal switch assembly including an electrically insulating housing; two snap switches accommodated in said housing in a side-by-side, parallel arrangement and adapted to control two independent electric circuits; each said snap switch having a switch actuating end and a snap contact adapted to be associated with a respective separate circuit; a plate-like bimetal element secured to said housing and having an end movable in an arcuate path and operatively connected with said switch actuating ends of said snap switches; a common desired value setter having a longitudinal axis oriented generally perpendicular to a length dimension of said snap switches; thread means connected with said desired value setter for providing for a longitudinal displacement of said desired value setter upon turning motion thereof; a force transmitting element having a first end secured to said housing and an arcuately movable second end operatively connected with an end of said desired value setter; each said snap switch having a snap spring integral with the respective snap contact and having a free end; the free end of each said snap spring being secured to said second end of said force transmitting element under bias of the respective snap spring; the improvement wherein

said end of said bimetal element has a generally U-shaped cutout separating terminal legs constituting said end of said bimetal element; said terminal legs being bent generally perpendicularly to said bimetal element and being oriented towards said housing;

said force transmitting element includes a first spring plate being in contact with said desired value setter and a second spring plate disposed parallel spaced from said first spring plate; said second spring plate being divided in a direction parallel to said length dimension of said snap switches for defining two spring legs constituting said second spring plate; said spring legs having free ends bent generally perpendicularly to said spring legs and being oriented towards said bimetal plate;

each said snap contact comprises an approximately rectangular frame having a cut and bent-out inner area forming the respective said snap spring; said frame has a transverse terminal web constituting said switch actuating end of the respective snap switch;

said free end of each said snap spring is supported by respective said spring legs of said second spring plate under bias of each said snap spring;

said terminal web of each said frame straddles a respective said terminal leg of said bimetal element under a tensioning bias of each said frame directed opposite the bias of the snap springs; and

two separate setting lugs arranged between said first and second spring plates; one of said setting lugs being a setscrew.

4,587,509

HALL EFFECT DEVICE WITH OVERLAPPING FLUX CONCENTRATORS

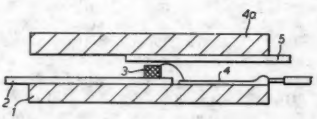
Gillies D. Pitt, Saffron Walden, and Philip Extance, Cambridge, both of United Kingdom, assignors to Standard Telephones & Cables, plc, London, England

Filed Jun. 28, 1984, Ser. No. 625,559

Claims priority, application United Kingdom, Jul. 6, 1983, 8318267

Int. Cl.⁴ H01L *43/00, 43/02*

U.S. Cl. 338—32 H **18 Claims**



1. A Hall effect device comprising a first flux concentrator comprising a thin ribbon of magnetic material having a high permeability and a tapered end portion;

a second flux concentrator comprising a thin ribbon of a magnetic material having a high permeability and a tapered end portion;

a Hall element;

said tapered end portions of said first and second flux concentrators overlapping each other, and said Hall element being positioned between said first and second flux concentrators where they overlap.

4,587,510

ANALOG JOYSTICK CONTROLLER

Syng N. Kim, Hoffman Estates, Ill., assignor to Wico Corporation, Niles, Ill.

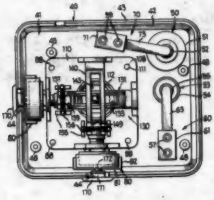
Filed Oct. 19, 1983, Ser. No. 543,469

Int. Cl.⁴ H01C *10/16*

U.S. Cl. 338—128 **21 Claims**

1. In an analog joystick controller including a housing and an operating shaft mounted in the housing for universal tilting movement with respect thereto between a neutral or home position and operating positions, the improvement comprising: bias means coupled to the operating shaft and shiftable between first and second operating conditions, said bias means in the first operating condition thereof being responsive to movement of the operating shaft from its home position for increasing the potential energy of said bias means to bias the operating shaft to its neutral or home position, said bias means in the second operating condition thereof storing minimal potential energy and being unresponsive to movement of the operating

shaft for accommodating free unbiased tilting movement of the operating shaft, and actuating means for selectively disposing



said bias means in either the first or the second operating condition thereof.

4,587,511

ELEVATOR SYSTEM WITH HALL LAMP STATUS MONITORING

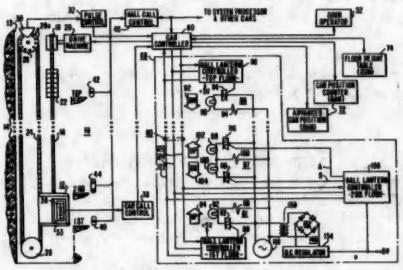
Linus R. Dirnberger, Randolph; Alan L. Husson, Hackettstown, both of N.J., and Michael J. Brick, Wallingford, Conn., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 30, 1983, Ser. No. 527,920

The portion of the term of this patent subsequent to Nov. 26, 2002, has been disclaimed.

Int. Cl.⁴ B66B *3/00*

U.S. Cl. 340—19 R **4 Claims**



1. An elevator system, comprising:

a building having a plurality of floors,

an elevator car mounted for movement in said building,

car controller means for directing said elevator car to serve floors of said building,

hall lamp means at each floor served by said elevator car,

hall lantern controller means at each floor served by said elevator car, each of said hall lantern controller means including a digital computer for preparing commands which selectively control the associated hall lamp means,

and hall lantern riser means having first, second and third conductors extending between said car controller means and said hall lantern controller means with said third conductor being common to the first and second conductors,

said car controller means including a digital computer for preparing and transmitting serial command messages over the first conductor of said hall lantern riser means, with each serial command message addressing a predetermined one of said hall lantern controller means, and including commands for the addressed hall lantern controller means,

the digital computer of each of said hall lantern controller means including means for recognizing its command messages, means for performing the associated commands, and means for transmitting a serial message over the second conductor,

the digital computer of said car controller means including means for maintaining a hall lamp status table in response to messages on the second conductor, with said digital computer being responsive to both the status of the elevator system and the hall lamp status table when preparing serial command messages for said hall lantern controller means,

said first, second and third conductors handling all serial communications between said car controller means and said hall lantern controller means, regardless of the number of said hall lantern controller means,

each of said hall lantern controller means including error detecting means for detecting an error in a command message it recognizes as being directed to it,

said means for transmitting a serial message over the second conductor transmitting a first serial message to the car controller means in response to detection of an error in a command message by said error detecting means, and a second serial message to the car controller means when no command message error is detected, after the associated hall lantern controller means performs the requested command,

said car controller means including means for retransmitting the same command message over the first conductor in response to receiving said first serial message from a hall lantern controller means on the second conductor,

said means for maintaining a hall lamp status table including means for maintaining the requested status of each hall lamp means, with said car controller means updating said requested status in response to each command message which is followed by the reception of said second serial message from the associated hall lantern controller means.

4,587,512

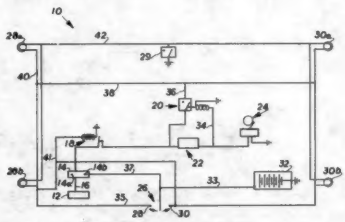
TURN SIGNAL ALARM

Harold W. Casey, 10800 U.S. Hwy. 19 S., Pinellas Park, Fla. 33565

Filed Sep. 20, 1984, Ser. No. 652,213

Int. Cl.⁴ B60Q *1/44*

U.S. Cl. 340—52 D **4 Claims**



1. A safety mechanism for vehicles equipped with a depressable brake pedal, left and right turn signal lights, a directional switch for selectively activating the turn signal lights, and a flasher means for effecting synchronous flashing of said turn signal lights, comprising:

a pressure sensitive switch means that is operably connected to said brake pedal and which is activated in response to pressure applied to said brake pedal,

a first relay means electrically connected to said pressure sensitive switch means,

a timer means electrically connected to said pressure sensitive switch means,

said timer means adapted to measure preselected periods of time and to generate an electrical signal at the expiration of the measured period of time,

a second relay means electrically connected to said first

relay means and disposed in shunting relation to said timer means,

an audible alarm means electrically connected to said pressure sensitive switch means,

a source of power electrically connected to said pressure sensitive switch means, said timer means and said alarm means through said first relay means so that depression of said brake pedal in the absence of prior directional switch activation serves to activate said alarm means and said timer means,

said alarm means being activated to advise a person operating a vehicle equipped with said safety mechanism that said directional switch has not been properly activated,

said timer means electrically connected to said flasher means so that said flasher means is activated by said timer means at the expiration of the time measured by said timer means to thereby effect synchronous flashing of all of the turn signal lights of said vehicle,

said source of power electrically connected to said first relay means through said directional switch so that said first relay means is tripped in response to activation of said directional switch which in turn effects tripping of said second relay means and the deactivation of said timer means and alarm means.

4,587,513

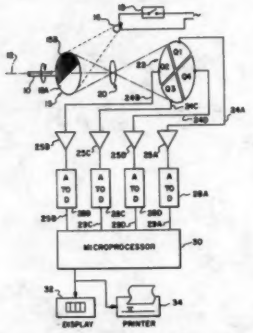
NONCONTACT SHAFT ANGLE DETECTOR

David E. Burrowes; Alan W. Holmes, and Daniel R. Valentine, all of Dayton, Ohio, assignors to Energy Innovations, Inc., Dayton, Ohio

Filed Jun. 25, 1984, Ser. No. 624,156

Int. Cl.[4] H03M *7/00*

U.S. Cl. 340—347 P **5 Claims**



1. A noncontact shaft angle detector for detecting the angular position of a rotating shaft comprising:

a patterned disc secured to the shaft for concentric rotation with the shaft, said disc being diametrically bisected into two sectors of different optical properties, the optical property of each sector being substantially uniform, whereby radiant energy directed to said disc will be encoded by the sectored pattern,

at least three detectors, each of which receives an angular portion of the encoded radiant energy, the portions collectively forming an annular array which is concentric with the shaft, and each of the detectors having an output connection which provides a variable output signal according to the amount of the encoded radiant energy received thereby,

optical means for directing the encoded radiant energy from said disc to said detectors, and

analog to digital converting means receiving separate signals from each of said output connections and providing a set of separate digital output signals which together define a unique rotational position of said disc.

4,587,514

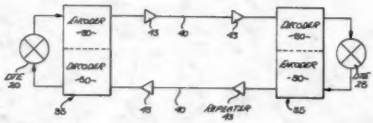
INTERFACE METHOD AND APPARATUS

Marc L. Schas, San Jose, and Steven C. Taylor, San Mateo, both of Calif., assignors to Verilink Corporation, Sunnyvale, Calif.

Filed Sep. 7, 1984, Ser. No. 648,124

Int. Cl.[4] H03M *7/28*

U.S. Cl. 340—347 DD **23 Claims**



1. A method for encoding data for transmission from a first data processing unit to a second data processing unit, said data being organized into a plurality of sequential channels identified by channel numbers (1 . . . N), each of said data channels comprising a plurality (X) of bits, comprising the steps of:

(a) detecting channels in said data which contain a predetermined value of bits and storing the channel numbers of said channels in a first storage means;

(b) deleting data contents of said data channels which contain said predetermined value of bits from said data;

(c) shifting said remaining data in each of said data channels such that data previously stored in said first data channel is stored in a data channel offset by the number of channels stored in said first storage means;

(d) inserting the channel numbers previously stored in said first storage means in empty data channels created by said shifting step;

whereby said data is encoded for transmission to said second data processing device.

4,587,515

SUPERVISING ARRANGEMENT

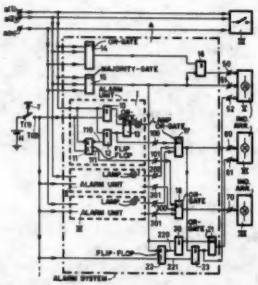
Coos de Vries, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 5, 1983, Ser. No. 491,850

Claims priority, application Netherlands, May 10, 1982, 8201901

Int. Cl.[4] G08B *29/00*

U.S. Cl. 340—506 **5 Claims**



1. A supervising arrangement for equipment in a station, the arrangement comprising an alarm system which is responsive to alarm signals occurring in the equipment, different alarm signals from different respective apparatus applied to respective alarm signal inputs of the arrangement being displayed by means of respective indication lamps for each of the possible

alarm signals, and energizing circuits for the indication lamps being controllable by means of a central key with which also, after reception of an alarm signal, the alarm system can be released for the reception of a subsequent alarm signal, characterized in that the alarm system comprises switching means for extinguishing, after the operating and releasing of the central key, all indication lamps which are lit and, when the central key is operated again, for re-lighting those indication lamps which correspond to subsisting alarm signals during the period of time the central key (T) remains operated.

4,587,516

PERSONAL SECURITY ALARM

Toshiro K. Hiraki, 2269 Plummer Ave., San Jose, Calif. 95125

Filed Jan. 18, 1985, Ser. No. 692,676
Int. Cl.[4] G08B *1/08, 13/00*; H04Q *7/00*
U.S. Cl. 340—539 **19 Claims**

1. A security alarm for an individual comprising:

a hand unit including transmitter means, actuating means operative to cause said transmitter means to produce a radio-frequency signal, and first attachment means for positioning said actuating means proximate the palm of a hand of said individual such that when said individual clenches said hand transmitter means is activated;

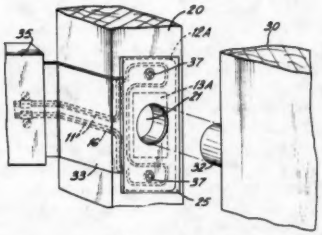
a torso unit including receiver means, alarm means responsive to said receiver means and operative to produce an audible alarm, and second attachment means for positioning said torso unit proximate the torso of said individual.

4,587,517

INTRUSION SENSING DEVICE

John G. Engstrom, and Robert A. Till, Jr., both of Indianapolis, Ind., assignors to AT&T Technologies, Inc., Berkeley Heights, N.J.

Filed Jan. 28, 1985, Ser. No. 695,514
Int. Cl.[4] G08B *13/08, 13/06*
U.S. Cl. 340—542 **12 Claims**



1. An intrusion sensing device for use on a frame having a hole therein for receiving a protrusion, the protrusion extending from a movable member, the intrusion sensing device comprising:

a first portion adapted to be attached to a surface of the frame under a strike plate fastened on the surface of the frame, the first portion including an electrically conductive path which is constructed so that it is broken when the member is displaced in a direction generally parallel to the strike plate surface without retracting the protrusion into the member; and

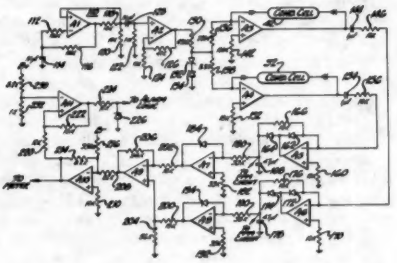
a second portion joined to the first portion, the second portion adapted to extend between the first portion and a means for detecting the breaking of the conductive path including means for electrically connecting the conductive path of the first portion to the detecting means.

4,587,518

MONITOR AND CONTROL SYSTEM FOR WATER PURIFICATION APPARATUS

Martin J. King, Largo, Fla., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 8, 1982, Ser. No. 439,679
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—603 **2 Claims**



1. In a water purification system, including a source of water to be purified and an outlet at which purified water is produced, apparatus comprising:

means for producing a first signal representative of the impurity concentration of said water to be purified;

means for producing a second signal representative of the impurity concentration of said purified water;

means, responsive to said first and second signals, for producing a percent rejection signal representative of the ratio of said second and first signals;

means for producing a signal representative of the temperature of the water of said system;

means for combining said temperature representative signal with said second signal to produce a temperature compensated impurity concentration signal;

means for comparing said percent rejection signal with a signal representative of a given percent of impurity rejection to produce a first alarm signal when said percent rejection signal exceeds said given percent signal in a given sense;

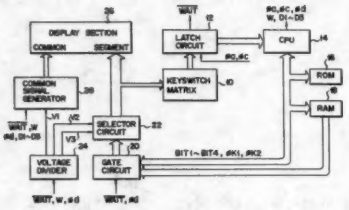
means for comparing said temperature compensated impurity concentration signal with a signal representative of a given impurity concentration to produce a second alarm signal when said temperature compensated impurity concentration signal exceeds said given impurity concentration signal in a given sense; and

an alarm which is activated by said first and second alarm signals.

4,587,519
INPUT DEVICE

Eiichi Munetsugu, and Hiroshi Ushiki, both of Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jul. 13, 1982, Ser. No. 397,763
Claims priority, application Japan, Jul. 15, 1981, 56-110206
Int. Cl.[4] G09G 3/00
U.S. Cl. 340—711 7 Claims



1. A calculator apparatus comprising:

a key switch matrix having a plurality of key switches arranged in rows and columns, said key switch matrix including a plurality of key switches arranged in a matrix;

a latching means including a plurality of latch circuits wherein each said latch circuit is associated with a particular row of said key switch matrix and is operated by the closure of any of said key switches that constitute an associated row, said latch circuits being connected to said key switches that constitute the associated row, said latching means producing a mode signal based on the detection of a key switch closure, said mode signal representing a first mode when said key switches are all open and representing a second mode upon closure of at least one of said key switches and further producing output signals representing a row in which said one key switch is operated;

control means for producing key-in detection clock signals having a level equal to an associated power supply level, for determining a closed key switch according to output signals from said latch means, for producing display signals having a level equal to a voltage-divided fraction of an associated power supply level, for executing arithmetic operations according to the result of said key switch determination, and for producing display signals representing a result of said arithmetic operations, said control means having a fixed number of signal input/output terminals;

display means with a plurality of character segment terminals for displaying data; and

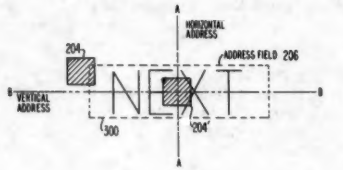
selector gate means connected to said control means for supplying one of two operating voltage signals, said selector gate means including a first group of selectors wherein each member of said first selector group is connected to the segment terminals of said display means and is associated with a particular column of said key switch matrix, with each said first selector group member being connected to the key switches that constitute its associated column, said selector gate means further including a second group of selectors, each member of said second group of selectors being electrically isolated from said key switch matrix and being connected to said character segment terminals of said display means,

said selector gate means including means responsive to the first mode signal for applying superposed signals composed of said key-in detection clock signals and the display signals to said display segment terminals and responsive to the second mode signal for applying said key-in detection clock signals to said key switches.

4,587,520
CURSOR CONTROLLED PAGE SELECTION IN A VIDEO DISPLAY

Brian Astle, Cranbury, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 7, 1983, Ser. No. 482,852
Int. Cl.[4] G09G 1/16
U.S. Cl. 340—712 6 Claims



1. An information selection and control system for use in a video receiving means having an information decoder means and a display means that displays at a corresponding location on said display means a given information selection legend included in a predetermined plurality of information selection legends, said display means being capable of displaying a cursor that can be positioned on said display means at a location selected from any of a plurality of locations that includes at least a location that is in proximity to said location of said given information selection legend and at least a location that is not in proximity to said location of said given information selection legend, said system comprising:

(a) memory means for storing said plurality of predetermined information selection legends wherein each legend comprises a corresponding information selection command;

(b) processor means coupled to said information decoder and to said memory means for storing information selection legends and related addresses that are displayed on said display means and that are included in said plurality of predetermined information selection legends;

(c) cursor means for supplying a cursor video signal to said display means to display said cursor thereon and for providing a cursor address signal that is indicative of the location where said cursor is positioned on said display means;

(d) comparing means coupled to said processor means and responsive to said cursor address signal for providing an information selection signal that identifies association between said cursor and said give information selection legend when the location of said cursor on said display means is at said location that is in proximity to said location of said given information selection legend so that when the location of said cursor is not in proximity to said location of said given information selection legend, said information selection signal is not provided, said comparing means also supplying an information selection code that is representative of the value of said given information selection legend;

(e) means responsive to said information selection signal for providing a user with a positive indication that said cursor is associated with said given information selection legend;

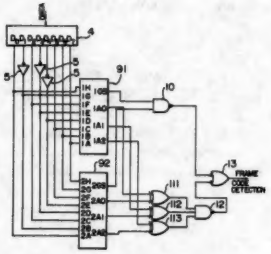
(f) means responsive to a user initiated command that is initiated by said user in response to said positive indication, for supplying an information enable signal; and

(g) circuit means for coupling said information selection code to input means of said decoder means and responsive to said information selection enable signal supplied thereto for causing said decoder means to select, in accordance with said code information that is to be displayed next on said display means.

4,587,521
CODE SIGNAL GENERATOR OR DETECTOR FOR VIDEO FRAME CODE

Masutomi Ohta, and Fumihiro Kawana, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 8, 1983, Ser. No. 559,216
Claims priority, application Japan, Dec. 10, 1982, 57-215430
Int. Cl.[4] H04Q *9/00*; H03K *5/18*; H04N *7/00*; G06F *11/00*
U.S. Cl. 340—825.3 **3 Claims**



1. A code signal detector comprising:

first and second priority encoders respectively having a plurality of input terminals respectively provided with priority orders beforehand and respectively producing decoded signals respectively composed of a plurality of bits which are determined from digital signals fed to said input terminals and said priority orders;

data receiving means having as many output terminals as said input terminals of each of said first and second priority encoders and producing identical logic levels at output terminals thereof when correct digital data have been received;

first connecting means for connecting said output terminals of said data receiving means to said input terminals of said first priority encoder, respectively;

second connecting means for connecting said output terminals of said data receiving means to said input terminals of said second priority encoder, respectively, an input terminal of said first priority encoder being connected to an input terminal of said second priority encoder having the reversed priority order;

a plurality of first gate means for producing exclusive-OR outputs with respect to bits corresponding to each other respectively included in said detected signals which are respectively sent out from said first and second priority encoders; and

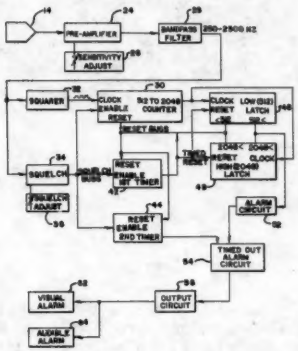
second gate means for producing the logical product with respect to outputs of said first gate means.

4,587,522
VEHICLE WARNING SYSTEM

Bob E. Warren, 4680 Temple Pl., Denver, Colo. 80236

Filed Jan. 27, 1984, Ser. No. 574,471
Int. Cl.[4] G08G *1/00*; H03D *3/18*
U.S. Cl. 340—902 **4 Claims**

1. A warning system for a vehicle or the like comprising: means for receiving and sensing audio energy and for transducing such audio energy to output signals indicative of the frequencies, and of the amplitude of each frequency, of the audio energy sensed; means for converting output signals from said sensor means to discrete output signals representative of the frequencies of the audio energy received by said sensor means, said signal converting means being in output signal receiving contact with said sensor means; means for measuring the time during which signals are transmitted by said sensor means, and which, after one or more predetermined time period, transmits activating signals, said timer means being in output signal receiving contact with said sensor means; means for counting the discrete signals output by said signal converting means, said counter means being in discrete signal receiving contact with said converting means, and which, after making one or more predetermined count transmits an activating signal; and means for activating an alarm, said alarm activating means

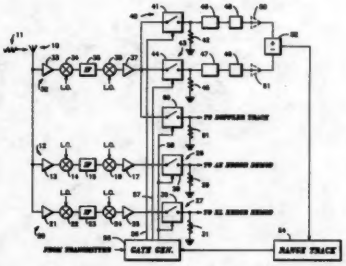


being in activating signal receiving contact with both said timer means and said counter means, whereby, when predetermined activating signals are received by said alarm activating means from both said timer means and said counter means said alarm activating means generates alarm activating signals.

4,587,523
RADAR RANGE TRACKING APPARATUS AND METHOD

Chester D. Shupe, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed Mar. 28, 1983, Ser. No. 479,227
Int. Cl.[4] G01S *13/18*
U.S. Cl. 343—7.3 **12 Claims**



1. A range tracking apparatus for processing a radar video signal comprising:

an early gate channel for sampling the video signal, said early gate channel having a gate width W_E and a channel gain A_E;

a late gate channel for sampling the video signal, said late gate channel having a gate width W_L and channel gain A_L; and

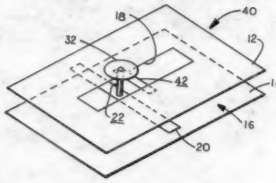
means coupled to said early and late gate channels for producing a range error signal, W_E being greater than W_L, A_L being greater than A_E, and said range error signal being approximately equal to zero when the apparatus is processing only noise.

4,587,524

REDUCED HEIGHT MONOPOLE/SLOT ANTENNA WITH OFFSET STRIPLINE AND CAPACITIVELY LOADED SLOT

Edward A. Hall, St. Louis, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Jan. 9, 1984, Ser. No. 569,265
Int. Cl.[4] H01Q *13/18*
U.S. Cl. 343—729 **9 Claims**



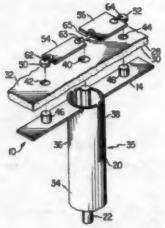
1. In a monopole/slot antenna having generally parallel spaced ground planes, the upper one of which has a slot therein, a stripline located between the ground planes, and a monopole extending from the stripline through said slot generally orthogonally to the upper ground plane and being top hat loaded at the outer end thereof, said improvement comprising means for offsetting said stripline toward the slotted ground plane, and means for capacitively loading said slot, said capacitance loading being in addition to any capacitance coupling between the top hat loaded monopole and the upper ground plane.

4,587,525

180 DEGREE DIPOLE PHASE SHIFTER

Kenneth M. Parsons, Treasure Island, Fla., and Darrell L. Helms, Tucson, Ariz., assignors to E-Systems, Inc., Dallas, Tex.

Filed Feb. 7, 1984, Ser. No. 577,751
Int. Cl.[4] H01Q *9/16*
U.S. Cl. 343—821 **16 Claims**



1. A dipole phase shifter for use in a phased array antenna, comprising:

an insulating substrate having first and second sides;

a dipole formed on said first side of said insulating substrate, said dipole having first and second conductive dipole arms;

a first diode of a predetermined conductivity type mounted on said second side of said insulating substrate and electrically-connected to said first dipole arm;

a second diode of an opposite conductivity type with respect to said first diode, said second diode mounted on said second side of said insulating substrate and electrically-connected to said second dipole arm;

input/bias means attached to said substrate for connecting both an input signal to said phase shifter and a bias signal to said first and second diodes, said bias signal alternatively biasing said diodes into a conductive state to produce a phase shift to said input signal;

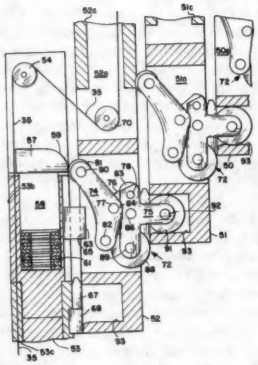
said input/bias means including an RF coaxial transmission line having a center conductor which extends through said insulating substrate to the second side thereof, and an outer conductor connected to said and first second dipole arms, said input/bias means further including transformation means mounted on said second side of said insulating substrate between said first and second diodes and said center conductor to compensate for the forward and reverse bias reactances of said first and second diodes.

4,587,526

LATCHING MECHANISM FOR DEPLOYABLE/RE-STOWABLE COLUMNS USEFUL IN SATELLITE CONSTRUCTION

Elvin L. Ahl, Jr., Yorktown, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 2, 1984, Ser. No. 606,431
Int. Cl.[4] H01Q *1/28*
U.S. Cl. 343—883 **19 Claims**



1. A latching mechanism for securing a plurality of telescoping elongated elements comprising:

each said elongated element having a first end and a second end, said first end including a piston head having a cam surface thereon tapered toward an adjacent elongated element, said piston head being integral with a piston shank and spring means disposed within said elongated element and contacting said piston shank,

said second end of each said elongated element having latch means pivotally secured thereto, said latch means including a roller bearing adapted to move along the elongated surface of an adjacent elongated element during elongated element deployment and engage said cam surface on said piston head, said roller bearing being rotatably disposed between and within one end of a pair of elbow shaped plates forming a restraining link of said latch, said restraining link being pivotally connected at the other end thereof to said elongated element, a connecting link received and rotatably pinned between said pair of plates forming said restraining link intermediate said roller bearing and said end connected to said elongated element, and

an actuating link formed of a pair of modified T-shaped plates with the top cross-member of the T having a long end and a short end, said connecting link being rotatably pinned connected between said pair of T-shaped plates at the short cross-bar end thereof, a pivot pin extending through the T-cross bar and serving to connect said actuating link to said elongated element, a first bearing wheel

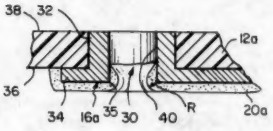
rotatably supported between said pair of T-plates at the long terminus of the cross-member, and a second bearing wheel rotatable supported between said pair of T-plates at the free end terminus of the vertical member of the T-plates.

4,587,527

CHARGING ELECTRODES BEARING A DOPED SEMICONDUCTOR COATING

Walter L. Schutrum, Kettering, and Hilarion Braun, Viva Creek, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 734,303, May 15, 1985, abandoned. This application Aug. 5, 1985, Ser. No. 762,808
Int. Cl.[4] G01D *15/18*; H05B *47/32*
U.S. Cl. 346—75 **4 Claims**



1. An array of charging electrodes for use in an ink jet printer, comprising a dielectric body and a plurality of said charging electrodes formed within said dielectric body so as to expose said electrodes at a surface of said body to ink drops passing nearby,

the improvement wherein each of said exposed electrodes is at least partially overcoated with a continuous coating substantially free of cracks of a semiconductive material doped to have a resistance, at room temperature, when measured transverse to the electrode, of between about 10^8 and about 10^{11} ohm, said material having essentially no solubility in ink,

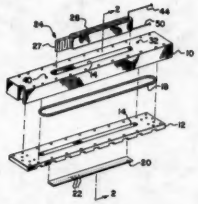
whereby the electrodes where overcoated (a) are protected from contact with stray ink, and (b) leak off surface charges on said continuous coating to said electrodes.

4,587,528

FLUID JET PRINT HEAD HAVING RESONANT CAVITY

William R. Beaudet, Melbourne, Fla., assignor to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 496,159, May 19, 1983, abandoned. This application Jul. 16, 1984, Ser. No. 630,926
int. Cl.[4] G01D *15/18, 15/16*
U.S. Cl. 346—75 **30 Claims**



1. A fluid jet print head for producing a plurality of jet drop streams of fluid, comprising:

manifold means defining an elongated resonant cavity therein,

an orifice plate defining a plurality of orifices arranged in at least one row, said orifice plate being mounted on said manifold means such that said orifices communicate with said cavity and said row extends in a direction generally parallel to the direction of elongation of said cavity, and

stimulator means mounted in said cavity and spaced from said orifice plate so as to define a fluid reservoir therebetween, said stimulator means including

a plurality of piezoelectric means compatibly resonant with said cavity which, when electrically excited, produce pressure waves of substantially uniform phase front which travel through fluid in said reservoir toward said orifice plate and which produce uniform disturbances along said orifice plate to cause breakup into jet drop streams of fluid flowing through said orifices, and

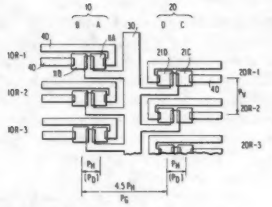
acoustic isolation material surrounding said piezoelectric means and providing a means of supporting said piezoelectric means in said cavity, whereby wave propagation along said stimulator means in a direction parallel to said row of orifices is prevented.

4,587,529

THERMAL COLUMNAR-ALIGNED, PLURAL-HEATERS PRINT HEAD

Kazuharu Itakura; Fukuo Matsumura, and Hideyuki Uejima, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Sep. 5, 1984, Ser. No. 647,560
Claims priority, application Japan, Sep. 5, 1983, 58-162049
Int. Cl.[4] G01D *15/10*; B41J *3/20*
U.S. Cl. 346—76 PH **11 Claims**



1. A thermal printer head for recording on a recording medium in response to recording data, said thermal printer head comprising:

a first column-group having a plurality of first heating-element-columns, each of said heating-element-columns including a plurality of first heating elements aligned in a first direction, said first heating elements in different heating-element-columns being aligned in a second direction perpendicular to said first direction to provide a plurality of first heating-element-rows, each of said first heating elements being connected between a common lead line and an individual lead line so that said first heating elements can be driven selectively and independently;

a second column-group provided apart from said first column-group and having a plurality of second heating-element-columns, each of said second heating-element-columns including a plurality of second heating elements aligned in said first direction, said second heating elements in different heating-element-columns being aligned in said second direction to provide a plurality of second heating-element-rows, each of said second heating elements being connected between a common lead line and an individual lead line so that said second heating elements can be driven sclectively and independently, said plurality of first heating-element-rows being displaced in said first direction with respect to said plurality of second heating-element-rows; and

a common lead conductor located between said first column-group and second column-group and running in said first direction, each common lead line connected to each

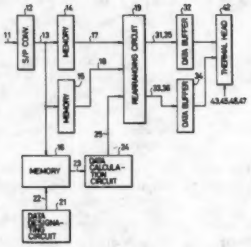
first heating element and each common lead line connected to each second heating element being connected to said common lead conductor.

4,587,530

THERMAL HEAD DRIVING/CONTROL APPARATUS

Akio Noguchi, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Sep. 13, 1983, Ser. No. 531,782
Claims priority, application Japan, Sep. 13, 1982, 57-158204
Int. Cl.⁴ G01D *15/10*
U.S. Cl. 346—76 PH **8 Claims**



1. In a recording device performing picture data recording one line at a time using a thermal head, a thermal head driving-/control apparatus comprising:

a picture data memory for storing picture signals each corresponding to one of a plurality of lines which make up a recorded image, each picture signal corresponding to an information bit, a plurality of which make up a line;

a correction data memory for storing picture signals corresponding to several of a plurality of lines which make up a recorded image, the most recently provided line successively displacing the least recently provided line in said correction data memory;

a correction data designating circuit for producing address information signals for said correction data memory such that picture signals corresponding to information bits located in the vicinity of a designated reference bit are output by said correction data memory;

a data calculation circuit for counting the number of picture signals addressed by said correction data designating circuit and provided from said correction data memory which contain information commanding printing of a black dot for producing a correction signal which has one of two states depending on the number of picture signals counted by said data calculation circuit which command printing of a black dot;

a rearranging circuit for interspersing picture signals from said picture data memory with corresponding correction signals provided from said data calculation circuit;

a data buffer for storing picture signals alternating with correction signals as provided in sequence from said rearranging circuit; and

a thermal head including a plurality of heating elements for printing a recorded image by activating heating elements thereof in response to picture and correction data signals provided by said data buffer;

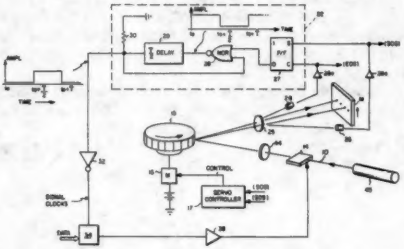
means for producing address information signals corresponding to a predetermined first number of bits on either side of said reference bit in the same line as said reference bit and bits of similar line position as said reference bit and said predetermined first number of bits on said either side of said reference bit in a second predetermined number of successive lines previous to said line containing said reference bit.

4,587,531

CLOCK SIGNAL PRODUCING APPARATUS

Paul E. Dangler, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 5, 1984, Ser. No. 668,124
Int. Cl.⁴ G01D *9/42*
U.S. Cl. 346—108 **1 Claim**



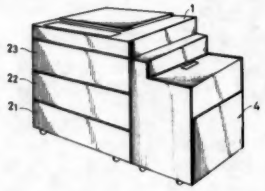
1. In apparatus for producing output signals which have a precise period, these signals control the timing of information-wise modulation of a laser light beam scanned across a photosensitive surface by rotating polygon, such apparatus including a first detector which is located in the scanned beam path and produces a start-of-scan (SOS) signal, and a second detector which is located in the scanned beam path and produces an end-of-scan (EOS) signal; the improvement comprising a $\tau/2$ delay line which produces the output signals; a nor gate coupled to the delay line and connected to receive the output signals; and a flip-flop controlled by the (SOS) and (EOS) signals and providing an input signal to the nor gate such that the output signals produced by the delay line have a precise period τ.

4,587,532

RECORDING APPARATUS PRODUCING MULTIPLE COPIES SIMULTANEOUSLY

Junichi Asano, Hoya, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 26, 1984, Ser. No. 603,939
Claims priority, application Japan, May 2, 1983, 58-78002; May 6, 1983, 58-79063
Int. Cl.⁴ G01D *15/24;* B65H *39/10;* G03G *15/00;* B41J *13/00*
U.S. Cl. 346—134 **6 Claims**



1. A recording apparatus for printing on recording sheets, said apparatus comprising:

means for generating a signal representing an image;

a plurality of printers each for reproducing simultaneously the same image on each recording sheet upon receiving the same signal produced by said generating means;

a single sheet delivering device for supplying the recording sheets; and

a plurality of register means each associated with one said printer for receiving recording sheets from said sheet delivering device and for feeding recording sheets

through said associated printer, each said register means including means for stopping conveyed recording sheets before entry into said associated printer to align the leading edges thereof, and for conveying recording sheets simultaneously into said printers in synchronism with the operation of said printers.

4,587,533

INFORMATION RECORDING MEDIA

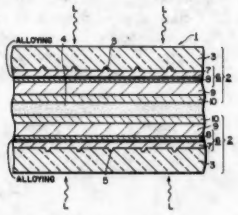
Yasuaki Nakane, Tokyo; Masataka Kitagawa, Kanagawa; Tadashi Kiyomiya, Saitama, and Tetsunosuke Yanada, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 23, 1984, Ser. No. 633,519

Claims priority, application Japan, Jul. 25, 1983, 58-135488

Int. Cl.[4] G01D *15/34;* **A04N** *5/76;* **G03C** *1/78;* **G03F** *7/00*

U.S. Cl. 346—135.1 **12 Claims**



1. An information recording medium for use with focused laser beams modulated with recorded information signals, comprising:

a substrate having a recording layer which has two layers:

a first layer formed on said substrate, and

a second layer formed on said first layer,

said substrate and said first layer having the property of high transmittance to laser beams,

said second layer being composed of a metal at least predominantly composed of a low melting metal which absorbs said laser beams and readily forms an alloy with the material of said first layer,

the thickness of said first layer being such that the reflectance to said laser beams entering from the substrate side is lowered by the interference effect caused by repetitive multiple reflections,

whereby the metal of said second layer is heated sufficiently to alloy to said first layer due to the focused irradiation of the laser beams from said substrate to said recording layer thereby changing the conditions for said repetitive multiple reflections and changing the amount of reflectance in said recording layer as viewed from said substrate, thereby carrying out the recording of said information.

4,587,534

LIQUID INJECTION RECORDING APPARATUS

Akio Saito, Zama; Seiichi Aoki, Machida; Tadayoshi Inamoto, Hiratsuka; Katsuyuki Yokoi, Sagamihara, and Masami Ikeda, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1984, Ser. No. 573,476

Claims priority, application Japan, Jan. 28, 1983, 58-13543; Jan. 28, 1983, 58-13544; Jan. 28, 1983, 58-13547

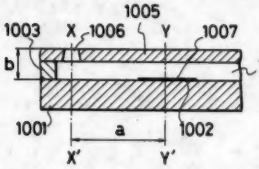
Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R **3 Claims**

1. A liquid injection recording apparatus having a discharge port for discharging liquid and forming flying droplets, a liquid flow path communicating with said discharge port for supplying liquid thereto from a liquid supply side, and energy generating means having an energy acting surface in said liquid flow path for causing liquid to be discharged from said discharge port, wherein:

the shortest distance from the center line of said discharge port to the central position of said energy acting surface is a,

the distance from the intersection of the center line of said discharge port and the outer surface thereof to the intersection of the bottom surface of said liquid flow path and the center line of said discharge port is b,



the center position of said energy acting surface is offset from the center line of said discharge port toward the liquid supply side, and

the value of a/b is 50 or less.

4,587,535

LIQUID JET APPARATUS WITH PRESSURE SENSOR FOR INDICATING ABSENCE/PRESENCE OF LIQUID

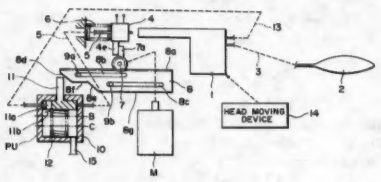
Yoshitaka Watanabe, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 17, 1984, Ser. No. 641,591

Claims priority, application Japan, Aug. 25, 1983, 58-155555

Int. Cl.[4] G01D *15/16;* **G01F** *23/00*

U.S. Cl. 346—140 R **25 Claims**



1. A liquid jet apparatus comprising:

liquid jet head means for emitting a liquid;

liquid storing means for storing a liquid to be supplied to said head means;

pressure generating means for generating a negative pressure to suck said liquid from said head means; and

detecting means for detecting the substantial presence and absence of liquid in said storing means, said detecting means being arranged to determine whether or not liquid is substantially present in said storing means when a predetermined period of time has elapsed after said pressure generating means operated.

4,587,536

IMAGE RECORDING APPARATUS WITH COLOR DETECTION

Jun Saito, Kawasaki, and Yuji Takahashi, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 28, 1984, Ser. No. 645,084

Claims priority, application Japan, Sep. 5, 1983, 58-162068

Int. Cl.[4] G03G *15/2*

U.S. Cl. 346—160 **15 Claims**

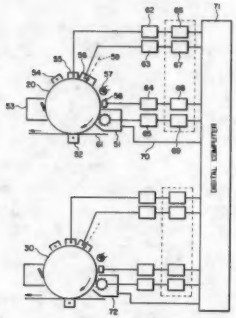
1. An image recording apparatus for receiving input image data and for recording images on a recording material, said apparatus comprising:

first recording means for recording an image on a recording

material based input image data, a color in which said first recording means records the image being selectable;

first detection means for detecting information indicating the color in which said first recording means records an image and for producing an output signal representing the detection;

second recording means for recording an image on a recording material based on input image data, a color in which said second recording means records the image being selectable;



second detection means for detecting information indicating the color in which said second recording means records an image and for producing an output signal representing the detection; and

selecting means for selecting image data supplied to said first and second recording means in accordance with the output signals produced by said first and second detection means.

4,587,537

HEAT-SENSITIVE RECORDING SHEET

Masahiro Miyauchi, and Masahiro Higuchi, both of Tokyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed May 13, 1983, Ser. No. 494,312

Claims priority, application Japan, May 14, 1982, 57-82131; Jun. 1, 1982, 57-92154

Int. Cl.[4] B41M *5/18*

U.S. Cl. 346—208 **3 Claims**

1. A heat-sensitive recording sheet having a heat-sensitive coating layer comprising a colorless to light-colored dye precursor as color former and benzyl p-hydroxybenzoate as color developer which causes said dye precursor to develop a color by reacting with said dye precursor when heated, in which said heat-sensitive coating layer further comprises, based upon the amount of benzyl p-hydroxybenzoate, from 10 to 60% by weight of a terephthalic acid ester having a melting point of 60° C. or higher, from 10 to 60% by weight of a wax having a melting point of 60° C. or higher and benzyl p-benzyloxybenzoate.

4,587,538

RECORD MATERIAL

Kenneth J. Shanton, Beaconsfield, and Farid Azizian, Marlow, both of England, assignors to The Wiggins Teape Group Limited, Hampshire, England

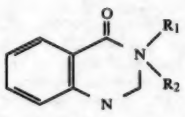
Filed Nov. 2, 1984, Ser. No. 667,888

Claims priority, application United Kingdom, Nov. 3, 1983, 8329361

Int. Cl.[4] B41M *5/16, 5/22*

U.S. Cl. 346—218 **5 Claims**

1. Pressure sensitive record material comprising at least a first substrate, at least one chomogenic material on said first substrate, and at least one coreactant therefor on a substrate which is either said first substrate or is a separate substrate, the chromogenic material and the coreactant being separated from each other by a pressure rupturable barrier, wherein the chromogenic material includes at least one 1,2,3,4-tetrahydroquinazolin-4-one of the general formula (I):

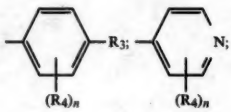


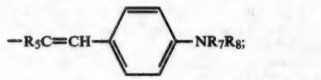
(I)

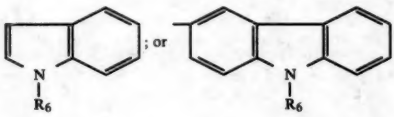
where

R_1 is a hydrogen atom, an alkyl group, a phenyl group, a phenyl group substituted with one or more halogen atoms, alkyl groups or ether groups, an aralkyl group which may be ring substituted with one or more halogen atoms, alkyl groups or ether groups; or an alkaryl group; and

R_2 is a group of one of the formulae:

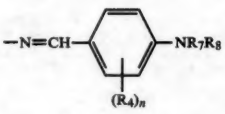






where:

R_3 is a group of the formula $-NR_7R_8$ or a group of the formula:



where:

R_4 is a hydrogen atom, an alkyl group, an alkoxy group, or a halogen atom;

n is from 1 to 4;

R_5 is a hydrogen or a halogen atom or an alkyl group;

R_6 is a hydrogen atom or an alkyl group;

R_7 is an alkyl group, an aryl group or an aralkyl or an aryl or aralkyl group substituted by one or more C_1 to C_4 alkyl or alkoxy groups and/or one or more halogen atoms; and

R_8 is a hydrogen atom or, independently of R_7, is a group as defined for R_7; or

R_7 and R_8 together with the nitrogen atom to which they are attached form a 5 or 6 membered heterocyclic ring which may include one or more other hetero atoms; or one of R_7 and R_8 is a hydrogen atom or a C_1 to C_4 alkyl group and the other together with the nitrogen atom to which it is bound and the 3- and 4- carbon atoms of the benzene ring form a 6 membered heterocyclic group; or

R_7, R_8, and the nitrogen atom to which they are bound together with the benzene ring form a julolidinyl group.

4,587,539

CHROMOGENIC DIHYDROFUROPYRIDINONES

Davor Bedekovic, Therwil, and Ian J. Fletcher, Magden, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

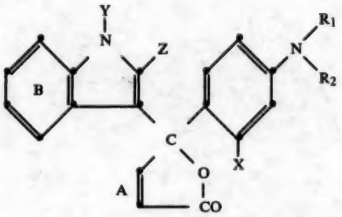
Division of Ser. No. 502,035, Jun. 7, 1983, Pat. No. 4,508,897, which is a continuation-in-part of Ser. No. 449,955, Dec. 15, 1982. This application Jan. 9, 1985, Ser. No. 690,075

Claims priority, application Switzerland, Dec. 23, 1981, 8250/81; Dec. 23, 1981, 8251/81; Apr. 7, 1983, 1868/83

Int. Cl.⁴ B41M *5/16, 5/18, 5/22*

U.S. Cl. 346—220 **13 Claims**

1. A pressure-sensitive or heat-sensitive recording material which comprises a support which contains or has coated thereon as color former at least one chromogenic azaphthalide of the formula



wherein

R_1 and R_2 independently of each other are hydrogen, C_1-C_{12}alkyl which is unsubstituted or substituted by halogen, hydroxyl, cyano or lower alkoxy, or are cycloalkyl, benzyl or phenyl, or benzyl or phenyl which are substituted by halogen, nitro, cyano, lower alkyl, lower alkoxy or lower alkoxycarbonyl;

or R_1 and R_2 together with the nitrogen atom to which they are attached are pyrrolidinyl;

X is hydrogen, halogen, lower alkyl, lower alkoxy, benzyl, phenyl, benzyloxy, phenoxy, or benzyl or benzyloxy which are substituted by halogen, nitro, lower alkyl or lower alkoxy;

Y is C_6–C_9alkyl;

Z is hydrogen, lower alkyl or phenyl; and

the ring A is a pyridine radical and

the benzene nucleus B is unsubstituted or substituted by halogen, cyano, nitro, lower alkyl, lower alkoxy, lower alkoxycarbonyl, amino, lower alkylamino or di-(lower alkyl)-amino.

4,587,540

VERTICAL MESFET WITH MESA STEP DEFINING GATE LENGTH

Thomas N. Jackson, Ossining, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 365,806, Apr. 5, 1982, abandoned. This application Jan. 17, 1985, Ser. No. 705,287

Int. Cl.⁴ H01L *29/80, 29/08, 29/40*

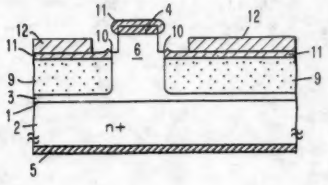
U.S. Cl. 357—22 **2 Claims**

1. A semiconductor structure comprising in combination:

a monocrystalline semiconductor substrate of one conductivity type having a planar top surface and a mesa extending from said planar top surface;

wherein said mesa has a step at a given distance from said planar top surface defining a base of said mesa which has a larger cross sectional area than the portion above the step;

an electrode with a thickness equal to said given distance which forms a rectifying contact with said base of said mesa; wherein said electrode is formed on said planar top surface around the periphery of said mesa contiguous with said base of said mesa; and



wherein said semiconductor substrate is semi-insulating in that region directly under and contiguous with said electrode;

ohmic contacts formed on the top of said mesa and the bottom of said substrate.

4,587,541

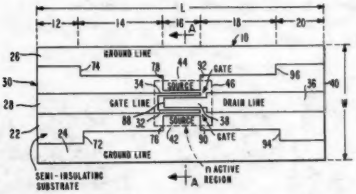
MONOLITHIC COPLANAR WAVEGUIDE TRAVELLING WAVE TRANSISTOR AMPLIFIER

G. Conrad Dalman, and Charles A. Lee, both of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Jul. 28, 1983, Ser. No. 518,221

Int. Cl.⁴ H01L *29/80*

U.S. Cl. 357—22 **16 Claims**



1. A monolithic coplanar waveguide travelling wave field effect transistor amplifier device, comprising:

a substrate having on a first surface an active region of a first conductivity type;

first, second, and third regions of a second conductivity type formed in spaced locations on said active region at said first surface of said substrate, said active region forming first and second channels between said first and second and said third and second regions, respectively;

first and second ground lines on said first surface of said substrate spaced from said active region, said ground lines including first and second source electrode portions, respectively, extending onto and contacting said first and third regions;

a drain line on said first surface spaced between said first and second ground lines, said drain line including an electrode portion extending onto and contacting said second region between said first and second source electrode portions; and

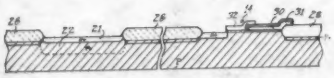
a gate line on said first surface spaced between said first and second ground lines, said gate line including spaced terminal electrode legs extending onto and contacting said active region between said source electrode portions and said drain electrode portion to control the flow of current between said source electrode portions and said drain line, whereby an input signal supplied across said gate line and said first and second ground lines generates a corresponding output signal across said drain line and said first and second ground lines.

4,587,542

GUARD RING FOR REDUCING PATTERN SENSITIVITY IN MOS/LSI DYNAMIC RAM

G. R. Mohan Rao, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 11, 1979, Ser. No. 083,928
Int. Cl.[4] H01L *29/78, 27/02*; G11C *11/24*
U.S. Cl. 357—23.6 **7 Claims**



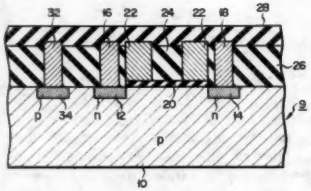
1. A semiconductor memory device comprising an array of memory cells in a face of a semiconductor body, peripheral circuitry in said face spaced from the array, and a guard region positioned in said face between the array and said circuitry to prevent diffusion of minority carriers from said circuitry to the memory, the guard region comprising a shallow heavily-doped region of opposite type over a much deeper heavily-doped region of one type, the body being of said one type but of much lighter doping level.

4,587,543

METHOD AND DEVICE FOR DETECTING METAL IONS

Ryoichi Ohtani, Yokohama, and Iwao Ohshima, Kawasaki, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed May 27, 1982, Ser. No. 382,774
Claims priority, application Japan, May 29, 1981, 56-81967
Int. Cl.[4] H01L *29/66*
U.S. Cl. 357—25 **8 Claims**



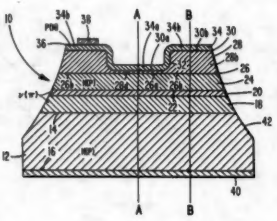
1. A device for detecting metal ions comprising:
(a) a metal ion detecting element, including
a semiconductor substrate of first conductivity type,
a source region of second conductivity type opposite to the first conductivity type, formed in said semiconductor substrate,
a source electrode formed on said source region,
a drain region of second conductivity type formed in said semiconductor substrate,
a drain electrode formed on said drain region,
a gate oxide film formed on the surface of said semiconductor substrate between said source region and said drain region,
a gate electrode formed on said gate oxide film, and
a metal ion introducing passage formed in said gate electrode in the direction of thickness thereof so as to allow the metal ions to be detected to migrate to said gate oxide film,
wherein said gate electrode is a conductive layer formed on the surface of said gate oxide film and said metal ion introducing passage is formed in said conductive layer all through the thickness thereof;
(b) a means, connected to said metal ion detecting element, for making a current flow between said source region and said drain region;
(c) a means, connected to said metal ion detecting element, for detecting a change of the strength of the current flowing through said metal ion detecting element, said change being brought by the electric charge of metal ions which reached said gate oxide film;
(d) an insulating layer formed in said metal ion introducing passage; and
(e) a protection layer for preventing gate oxide film from being easily imbued with metal ions, which covers said metal ion introducing passage and which is made of a material which does not allow easy migration of the metal ions therethrough.

4,587,544

AVALANCHE PHOTODETECTOR

Paul P. Webb, Beaconsfield, Canada, assignor to RCA Inc., Toronto, Canada

Filed Sep. 14, 1984, Ser. No. 650,728
Claims priority, application Canada, Apr. 10, 1984, 451637
Int. Cl.[4] H01L *27/14, 31/00*
U.S. Cl. 357—30 **6 Claims**



1. An avalanche photodetector comprising:
a substrate of first conductivity type having a first major surface;
a light-absorptive region of first conductivity type overlying said first major surface;
a first region of first conductivity type overlying said absorptive region and having a surface comprising a central area and a peripheral area;
a second region comprising a central zone over said central area and a peripheral zone over said peripheral area wherein said second region has a well therein over said central area and extending towards said central area and said central zone is thinner than said peripheral zone;
a third region of opposite conductivity type overlying said second region;
a first electrical contact to said third region; and
a second electrical contact to said substrate.

4,587,545

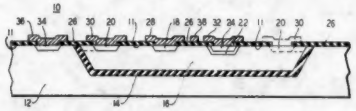
HIGH VOLTAGE DIELECTRICALLY ISOLATED REMOTE GATE SOLID-STATE SWITCH

Joseph E. Berthold, Stirling; Adrian R. Hartman, New Providence, both of N.J.; Terence J. Riley, Wyomissing, Pa., and Peter W. Shackle, West Melborne, Fla., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 107,780, Dec. 28, 1979, which is a continuation-in-part of Ser. No. 972,022, Dec. 20, 1978, abandoned. This application Mar. 27, 1981, Ser. No. 249,281
Int. Cl.[4] H01L *29/72*
U.S. Cl. 357—38 **4 Claims**

1. A switching element comprising a semiconductor body having a bulk region which is of one conductivity type and of relatively high resistivity and which includes anode, gate, and cathode regions being mutually spaced apart and localized along a common planar surface of the bulk region, each being of relatively low resistivity, the cathode and gate regions being of the opposite conductivity type from that of the bulk and the anode region being of the same conductivity type as that of the bulk, and separate cathode, anode and gate electrodes sepa-

rately attached to the cathode; anode, and gate region, respectively, a semiconductor substrate and a dielectric layer; the semiconductor body being separated from the semiconductor substrate by the dielectric layer; the semiconductor substrate having a separate electrode coupled thereto for application thereto of the most positive potential used with the switching element if the semiconductor body is of p type conductivity, and at the most negative potential used with the switching element if the semiconductor body is of n— type conductivity; the gate region being located in a portion of the semiconductor body removed from the portion thereof located directly between the anode and cathode regions; the parameters of the various portions of the switching element being such that with the potential of the anode region being forward bias with



respect to the cathode region and the potential of the gate region being insufficient to essentially completely deplete a cross-sectional portion of the bulk of the semiconductor body between the anode and cathode regions there is facilitated a current flow between the anode and cathode regions via the bulk, and with the anode region being forward biased with respect to the cathode region and the potential of the gate region being of sufficiently greater magnitude than that of the anode region to essentially completely deplete a cross-sectional portion of the bulk of the semiconductor body between the anode and cathode regions and to cause this portion of the bulk of the semiconductor body to be at a potential which is greater in magnitude than the anode region, there is facilitated an interrupting of current flow between the anode and cathode regions.

4,587,546

LIGHT-TRIGGERABLE THYRISTOR HAVING A LOW LIGHT POWER REQUIREMENT

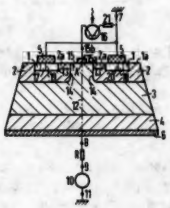
Helmut Herberg, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 18, 1983, Ser. No. 495,800

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1982, 3226613

Int. Cl.⁴ H01L *29/74, 31/06*

U.S. Cl. 357—38 **10 Claims**



1. In a light-triggerable thyristor arrangement of the type in which a semiconductor body comprises an n emitter carrying a cathode electrode on a boundary surface of the body, a p base contracting the n emitter, an n base contacting the p base, and a p emitter contacting the n base and carrying an anode electrode, and in which a p projection of the p base and an n projection of the n base extend adjacent one another up to the boundary surface, the improvement therein comprising:

a further electrode carried on the boundary surface and contacting the n projection; and

a light-sensitive circuit connected between the cathode electrode and said further electrode, said p projection comprising a recess extending to the boundary surface, and

said n projection extending through and filling said recess.

4,587,547

ELECTRODE STRUCTURE FOR A SEMICONDUCTOR DEVICES

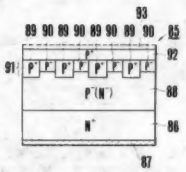
Yoshihito Amemiya, Fuchu; Takayuki Sugeta, Tokyo, and Yoshihiko Mizushima, Fuchu, all of Japan, assignors to Nippon Telegraph & Telephone Public Corp., Tokyo, Japan

Continuation of Ser. No. 125,284, Feb. 27, 1980, abandoned. This application Jul. 12, 1983, Ser. No. 512,942

Claims priority, application Japan, May 7, 1979, 54-55600; May 7, 1979, 54-55601; Sep. 4, 1979, 54-113216

Int. Cl.⁴ H01L *29/04, 29/06, 29/46, 29/91*

U.S. Cl. 357—59 **3 Claims**



1. An electrode structure for use in semiconductor devices comprising:

a semiconductive layer;

a polycrystalline silicon conductive layer disposed on one surface of said semiconductive layer, said polycrystalline silicon conductive layer having a high impurity concentration;

first regions which intervene between said layers and define main passages for transmitting minority carriers from said semiconductive layer to said conductive layer; and

second regions which intervene between said layers and define main passages for conveying majority carriers between said semiconductive layer and said conductive layer, said first and second regions being selectively formed on said semiconductive layer so as to be adjacent to one another and to lie parallel with respect to the current paths.

4,587,548

LEAD FRAME WITH FUSIBLE LINKS

Dimitry G. Grabbe, Lisbon Falls, Me., and Richard C. Downs, Elizabethtown, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

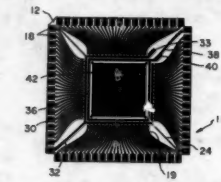
Continuation-in-part of Ser. No. 371,837, Apr. 26, 1982, abandoned. This application Jan. 20, 1983, Ser. No. 459,436

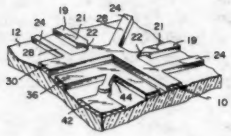
Int. Cl.⁴ H01L *23/12, 23/48*

U.S. Cl. 357—70 **7 Claims**

1. A metallic lead frame for manufacturing a semiconductor chip carrier, said lead frame having a planar surface which is to be bonded to a ceramic substrate, said lead frame comprising plurality of outer leads extending to a plurality of locations about the periphery of the lead frame and a plurality of signal leads extending from said outer leads toward the center of said lead frame, each said signal lead having a first end attached to a respective outer lead and a second end attached to support means toward the center of said lead frame, each said signal lead having a neck portion proximate to said second end, said neck portion being of smaller cross section than the rest of the signal lead, characterized in that the support means is a ground bus which is to be bonded to said ceramic substrate, said

ground bus having a planar surface which is coplanar with the planar surface of said lead frame, said neck portion being





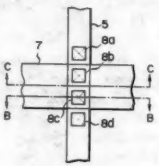
recessed from said planar surfaces, whereby, upon bonding said lead frame to said substrate, said neck portion will not be bonded to said substrate.

4,587,549

MULTILAYER INTERCONNECTION STRUCTURE FOR SEMICONDUCTOR DEVICE

Yukihiro Ushiku, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Apr. 7, 1983, Ser. No. 482,783
Claims priority, application Japan, Jun. 4, 1982, 57-96032
Int. Cl.[4] H01L *21/283, 23/18, 21/94*
U.S. Cl. 357—71 **2 Claims**



1. A multilayer interconnection structure for a semiconductor device comprising:

a semiconductor substrate;

at least three interconnecting layers and at least two insulating layers deposited on the surface of said substrate with each one of said insulating layers being interposed between adjacent ones of said interconnecting layers;

connection means including a plurality of contact holes formed in at least a first one of said at least two insulating layers in order to insure a desired connection between a first and a second of said at least three interconnecting layers wherein said first and second layers are separated by said first insulating layer; and

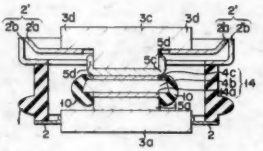
wherein said second interconnecting layer and a third one of said at least three interconnecting layers are spaced from each other by a second one of said at least two insulating layers such that the projection of said third interconnecting layer onto said second interconnecting layer defines an intersecting area above at least one of said plurality of contact holes with the cross-sectional area of said at least one of said contact holes being less than said intersecting area and wherein at least another one of said plurality of contact holes does not have said intersecting area located above it.

4,587,550

PRESS-PACKED SEMICONDUCTOR DEVICE WITH LATERAL FIXING MEMBER

Hideo Matsuda, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasai, Japan

Continuation of Ser. No. 331,023, Dec. 15, 1981. This application Aug. 3, 1984, Ser. No. 637,336
Claims priority, application Japan, Dec. 16, 1980, 55-176477
Int. Cl.[4] H01L *23/36, 23/10*
U.S. Cl. 357—79 **8 Claims**



1. A press-packed semiconductor device comprising:

a semiconductor element including a semiconductor substrate with first and second main surfaces;

first and second electrodes formed on said first and second main surfaces of said semiconductor substrate, respectively, said first electrode providing an exposed portion at the peripheral portion of said first main surface;

first and second heat buffer plates contacting said first and second electrodes, respectively said first heat buffer plate and said first electrode having substantially the same peripheral shape;

first and second electrode disk members clamping therebetween said semiconductor element via said first and second heat buffer plates respectively in a pressing manner, said first electrode disk member fixing said first heat buffer plate; and

a fixing member made of electrical insulating material and fixed on said exposed peripheral portion of said first main surface of said semiconductor substrate, said member being in abutting relation with the periphery of said first electrode, the inner portion of the surface of said fixing member being substantially in contact with the other peripheral surface of said first heat buffer plate and the portion of said fixing member surface facing said first electrode disk member being rounded to facilitate the seating of said first heat buffer plate against said first electrode during assembly of said semiconductor device whereupon said first heat buffer plate and said first electrode are fixed in peripheral alignment.

4,587,551

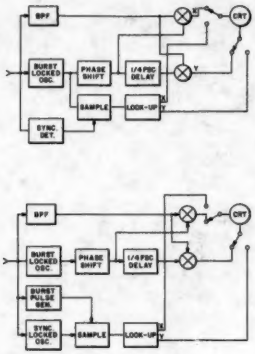
MEASUREMENT OF SC/H PHASE

Bruce J. Penney, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 23, 1984, Ser. No. 602,858
Int. Cl.[4] H04N *17/02*
U.S. Cl. 358—10 **5 Claims**

1. An instrument for use in indicating SC/H phase of a composite video signal, comprising a display device for providing a polar display, a device for generating from the reference subcarrier burst of the video signal a first input signal for the display device such as to cause the display device to display an indication at a predetermined angular position of the polar display, phase determining and indicating means for determining the time difference between the sync point and that zero crossing of the extrapolated subcarrier wave which is closest to the sync point and for generating from said time difference a second input signal for the display device such as to cause the display device to display an indication at a position of the polar

display that is angularly spaced from a predetermined axis of the polar display by an angle given by the fraction having as its



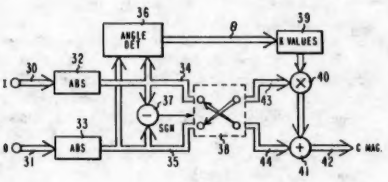
denominator the period of the reference subcarrier wave and as its numerator the product of said time difference and 360°.

4,587,552

APPARATUS FOR GENERATING THE MAGNITUDE OF THE VECTOR SUM OF TWO ORTHOGONAL SIGNALS AS FOR USE IN A DIGITAL TV RECEIVER

Danny Chin, Plainsboro, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Sep. 2, 1983, Ser. No. 529,136
Int. Cl.[4] H04H *9/64*
U.S. Cl. 358—28 **17 Claims**



1. Apparatus for generating magnitude values, C, of the vector sum of component signal vectors A and B comprising:

means for applying signal vectors A and B;

means for generating signals corresponding to the angles θ of said vector sum relative to the axis of one of said signal vectors A and B;

means responsive to said θ signals for generating signals corresponding to values K;

means responsive to the signal vectors A and B for determining the signal vector A or B having the lessor magnitude;

means responsive to the signal corresponding to the values K for weighting the signal vector A or B having the lessor magnitude, by the factor K; and

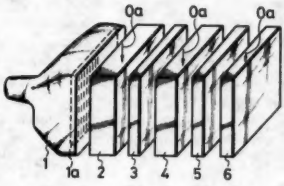
means for summing the weighted signal with the signal corresponding to the signal vectors A or B having the greater magnitude, the output of the summing circuit being substantially equal to the magnitude of the vector sum.

4,587,553

APPARATUS FOR DISPLAYING IMAGES WTIH REDUCED COARSENESS

Toshiro Watanabe, Zushi, and Akio Ohkoshi, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 10, 1983, Ser. No. 550,559
Claims priority, application Japan, Nov. 12, 1982, 57-198776
Int. Cl.[4] H04N *9/16, 9/12, 5/72;* **H01J** *29/10*
U.S. Cl. 358—64 **5 Claims**



1. An image display apparatus for displaying an image with reduced coarseness comprising:

image display means having a plurality of vertically arranged, stripe-shaped picture display elements and having a black stripe disposed between adjacent picture display elements, all of which are arranged successively in repeating sets in a relative horizontal direction with said sets having a predetermined pitch for displaying an image as a pattern of picture elements formed by rays respectively emitted from said picture display elements; and

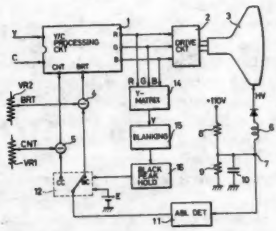
double refraction plate means disposed in front of and on said image display means for dividing each said ray received from a respective picture display element of said image display means into an ordinary ray and an extraordinary ray, said double refraction plate means having a thickness for providing a displacement between each ordinary ray and a respective extraordinary ray such that each said ordinary ray and said respective extraordinary ray, when emitted from a front surface of said double refraction plate means, are displaced from one another in a horizontal direction relative to said vertically arranged picture display elements by a selected displacement less than the said predetermined pitch of said repeating sets of picture display elements.

4,587,554

CRT DRIVE CONTROL CIRCUIT

Takahiko Tamura, Tokyo, and Masaharu Tokuhara, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 20, 1984, Ser. No. 642,439
Claims priority, application Japan, Aug. 22, 1983, 58-152923
Int. Cl.[4] H04N *9/16, 5/68, 5/235, 5/57*
U.S. Cl. 358—74 **6 Claims**



1. A CRT drive control circuit for beam current control in response to a level of a beam current of a CRT, comprising:

signal processing circuit means for processing an incoming color video signal;

CRT drive circuit means connected to an output of said signal processing circuitmeans for generating a drive signal to be supplied to said CRT;

dark level detecting circuit means connected to said output of the signal processing circuit means for detecting a dark level;

beam current detecting circuit means connected to said CRT to detect a level of beam current of the CRT; and

feedback circuit means between the beam current detecting circuit means and said signal processing circuit means for controlling said CRT drive circuit means so as to control a video signal therein in response to a detected beam current, and wherein either contrast level or brightness level of the video signal is selectively controlled depending on a level of the detected beam current.

4,587,555

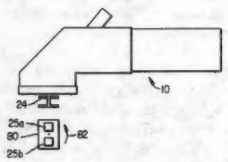
NEUTRON AND X-RAY RADIATION COMBINED INSPECTION MEANS AND METHOD

Sammy F. Carollo, Irving, and William E. Dance, Dallas, both of Tex., assignors to LTV Aerospace and Defense Co., Dallas, Tex.

Continuation-in-part of Ser. No. 324,519, Nov. 24, 1981. This application Dec. 1, 1983, Ser. No. 557,035

Int. Cl.[4] H04M *5/32*

U.S. Cl. 358—111 **21 Claims**



1. A radiographic inspection system for producing a shadowgraph or transmission image of an object to be inspected, comprising:

neutron radiation means for selectively directing thermal neutron radiation through the object;

X-ray means for selectively directing X-ray radiation through the object;

a radioluminescent screen structure positioned to receive the neutron radiation and X-ray radiation directed through the object, said screen structure including means for producing a scintillation shadowgraph pattern in response to impingement on said screen structure of radiation directed through the object;

camera means having its optical input section directioned toward said radioluminescent screen for receiving the scintillation shadowgraph pattern and having a target means for forming charge patterns corresponding to the scintillation patterns produced on said radioluminescent screen and scanning means for scanning the target means to generate an optical signal corresponding to the charge pattern formed on the target means; and

means for processing signals derived from sequential scans of the target and for combining the signals generated as a result of the exposure of the object to radiation from said neutron radiation means and generated as a result of exposure of the object to radiation from said X-ray means and for producing a television display corresponding to the combination of said signals.

4,587,556

TELEVISION STANDARDS CONVERTERS

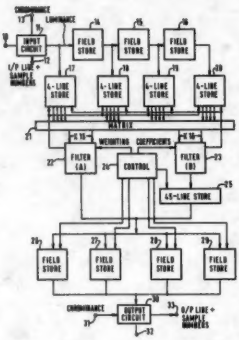
Mark C. Collins, Basingstoke, United Kingdom, assignor to Sony Corporation, Tokyo, Japan

Filed May 7, 1984, Ser. No. 607,764

Claims priority, application United Kingdom, May 17, 1983, 8313512

Int. Cl.[4] H04N *7/01*

U.S. Cl. 358—140 **6 Claims**



1. A television standards converter comprising:

an input store for receiving an input digital television signal of one standard and deriving therefrom arrays of sixteen lines, each array consisting of four successive lines from each of four successive fields of said input television signal;

a weighting coefficient store for storing sets of sixteen weighting coefficients, respective said sets corresponding to positions both spatial and temporal of respective lines of an output digital television signal relative to said sixteen lines of said input television signal;

two interpolation filters each for deriving line-by-line said output television signal by multiplying corresponding sample values from each of said sixteen lines of said input television signal by a respective weighting coefficient in a said set of weighting coefficients and summing the resulting products to form an interpolated sample value;

an output store for receiving and storing said derived lines of said output television signal and from which said output television signal is read; and

a multi-line store connected between the output of one of said interpolation filters and said output store and used to store the additional lines derived when said output television signal has more lines per field than said input television signal.

4,587,557

FIELD NUMBER CONVERSION CIRCUIT

Laurens Doornhein; Johannes G. Raven; Petrus W. G. Welles; Marcellinus J. J. C. Annegarn, and Antonius H. H. J. Nillesen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 21, 1983, Ser. No. 534,443

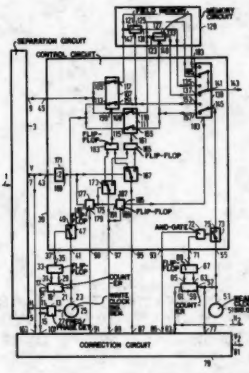
Claims priority, application Netherlands, Sep. 22, 1982, 8203668

Int. Cl.[4] H04N *7/01*

U.S. Cl. 358—140 **8 Claims**

1. A field number conversion circuit for converting a television signal to be converted having a first field frequency into a converted television signal having a second field frequency, comprising a field memory circuit for writing therein for each field the television signal to be converted, a read clock signal generator which is frequency-coupled to the horizontal deflec-

tion frequency of the converted television signal, a control circuit for controlling writing and reading of the memory circuit, a circuit for obtaining display synchronizing signals for the converted television signal and a correction circuit for obtaining, for each field according to the position of the television signal to be converted in an associated picture, a corresponding position of the converted television signal in an associated picture, characterized in that the correction circuit comprises a measuring circuit for measuring in each field, the time interval between a field synchronizing signal of the television signal to be converted and an instant corresponding to a



certain position in the relevant field of the picture, and for adequately transferring this time interval to a coupling circuit for coupling between the start of the reading operation and the display synchronizing signals of the converted television signal, so that in a field of the converted television signal, the mutual positions of the vertical and horizontal synchronizing signals and of the converted television signal correspond, except for a deviation which is substantially constant from field to field of the signal to be converted, to the mutual positions of the vertical and horizontal synchronizing signals and of the television signal to be converted in the corresponding field of the television signal to be converted.

4,587,558

ADDRESS SIGNAL GENERATING CIRCUIT FOR A MEMORY CIRCUIT

Hiroyuki Sugiyama, Isehara; Nobuaki Takahashi, Yamato; Takeshi Shibamoto, Sagamihara; Hideo Sato, Yokohama; Yoshiaki Amano, Fujisawa, and Koji Tanaka, Tokyo, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Oct. 11, 1983, Ser. No. 540,553

Claims priority, application Japan, Oct. 15, 1982, 57-181094

Int. Cl.[4] H04N *5/14*

U.S. Cl. 358—160 **5 Claims**

1. An address signal generating circuit for a memory circuit, digital data being successively written in or read out from an address in said memory circuit, said address being successively incremented by a predetermined value, said address signal generating circuit comprising:

a first latch driver for producing an m-bit signal corresponding to an upper m bits of a 2m-bit address signal which is to be generated, where m is an integer;

a second latch driver for producing an m-bit signal corresponding to a lower m bits in said address signal;

gate means for generating a specific signal which determines values of upper m bits and lower bits of a 2m-bit signal which has said predetermined value;

a first adder for adding at least a value of upper n bits of the signal which has the predetermined value and a value of upper n bits of an output signal of said first or second latch driver, and for producing an n-bit signal which corresponds to upper n bits of a common input signal of said first ans second latch drivers, where n is an integer less than m;

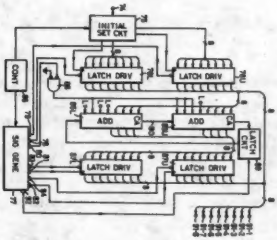
a second adder for adding at least a value of lower m-n bits of the signal which has the predetermined value and lower m-n bits of the output signal of said first or second latch driver, and for producing a (m-n)-bit signal which corresponds to lower m-n bits of the common input signal of said first and second latch drivers;

latch means for supplying a carry signal of said first adder to said second adder so as to add the carry signal with the values supplied to said second adder, a carry signal of said second adder being supplied to said first adder so as to add the carry signal of said second adder with the values supplied to said first adder;

an initial value setting circuit for setting an initial value of said address signal and for producing a 2m-bit signal which has said initial value;

a third latch driver for latching a signal which corresponds to upper m bits of the 2m-bit signal which has said initial value, said third latch driver producing a latched signal thereof through output terminals and supplying the latched signal thereof to said first adder;

a fourth latch driver for latching a signal which corresponds to lower m bits of the 2m-bit signal which has said initial



value, said fourth latch driver producing a latched signal thereof through the output terminals and supplying the latched signal thereof to said second adder; and

driver control means for generating control signals including control signals for controlling operations of said first through fourth latch drivers,

said driver control means alternately operating said first and second latch drivers by the control signals so that said first and second latch drivers alternately and time-divisionally produce the upper m bits ot the 2m-bit address signal and the lower m bits of the 2m-bit address signal, said first latch driver latching output signals of said first and second adders which are obtained by supplying the output signal of said first latch driver to said first and second adders when said first latch driver is operated, said second latch driver latching output signals of said first and second adders which are obtained by supplying the output signal of said second latch driver to said first and second adders when said second latch driver is operated,

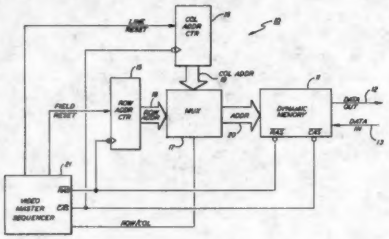
said driver control means operating said third and fourth latch drivers by the control signal so that the output signals of said third and fourth latch drivers are produced through the output terminals time-divisionally,

said gate means generating said specific signal responsive to one of the control signals generated from said driver control means.

4,587,559
REFRESHING OF DYNAMIC MEMORY

Andrew Longacre, Jr., Skaneateles, and Joseph J. Sarofeen, Auburn, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Mar. 11, 1983, Ser. No. 474,330
Int. Cl.⁴ H04N *5/14*
U.S. Cl. 358—160 **5 Claims**



1. In a video system wherein a field of image data that is to be displayed is stored in a refreshable memory, the method of refreshing the memory during the field that includes the steps of

supplying a row address signal from a row address counter to the memory to select a row of memory for display at the beginning of a field,

latching the selected row of memory whereby the row is refreshed,

supplying a train of cloumn address signals from a column address counter to the memory to sequentially address each memory cell in the selected row whereby the data stored in the selected row is transferred to a video display means to provide a line video data,

incrementing the row address counter a number of times during the video horizontal retrace period and supplying said address signals to the memory to sequentially refresh a given number of rows,

incrementing the row address counter once again to address the next row to be displayed, and

repeating the above noted steps until such time as the entire field of data stored in the memory is displayed.

4,587,560
METHOD OF IMPROVING TELEVISION SIGNAL-TO-NOISE RATIO

Ulrich Reimers, Ober-Ramstadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

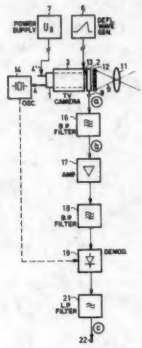
Filed Jun. 4, 1984, Ser. No. 616,931
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1983, 3321222
Int. Cl.⁴ H04N *5/14, 5/213, 5/38*
U.S. Cl. 358—166 **13 Claims**

1. Method of improving the signal-to-noise ratio of video signals originating in a television camera comprising the steps of:

shifting the frequency the spectrum of the camera output signals into a carrier frequency region at the very inception of said signals in the pickup tube (1) by interrupting the incidence of the picture light on the signal electrode (2) of the pickup tube by a fine grid interrupting light of all colors and so oriented with respected to the signal electrode that the scanned video signal will appear as modulation of a suitable carrier frequency;

filtering the output signal of said picture tube for suppression of video baseband frequency signals, and

amplifying the filtered signals at frequencies in the carrier frequency region before reconverting the filtered signals

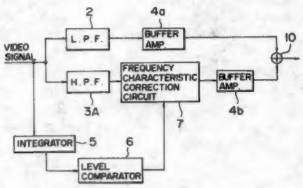


to the video baseband frequency range for further processing.

4,587,561
NOISE REDUCTION CIRCUIT ARRANGEMENT OF SOLID-STATE VIDEO CAMERA

Hiroshi Kudo, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 18, 1983, Ser. No. 542,990
Claims priority, application Japan, Oct. 20, 1982, 57-182820
Int. Cl.⁴ H04N *5/217*
U.S. Cl. 358—167 **12 Claims**



1. A noise reduction circuit arrangement under low brightness operation of a video camera comprising:

low-pass filter means supplied with a video signal produced from an image pickup element, for passing a low-frequency band component of the video signal;

high-pass filter means supplied with the video signal produced from the image pickup element, for passing a high-frequency band component of the video signal;

level detector means detecting the level of the video signal, for producing a control signal in accordance with a degree of brightness of the video signal;

correcting means responsive to the control signal produced from said level detector means, for controlling frequency characteristics of the high-frequency band component of the video signal passed through and produced from said high-pass filter means such that the amount of the high-frequency band component is more decreased when brightness of the video signal is low than when the brightness is not low; and

adder means for adding the low-frequency band component from said low-pass filter means and the high-frequency band component produced from said high-pass filter means and controlled by said correcting means;

said correcting means comprising variable gain amplifier means which increases gain for the high-frequency band component by receiving the control signal produced from

said level detector means when the brightness of the video signal is not low, said variable gain amplifier means including a transistor amplifier responsive to said control signal to switch connection and disconnection of a capacitor in parallel with an emitter resistor of the transistor amplifier.

4,587,562

SOLID STATE IMAGE PICK-UP DEVICE

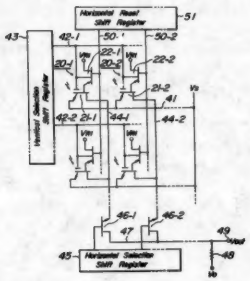
Masaharu Imai, Kamiina; Jun-ichi Nishizawa, No. 6-16, 1-Chome. Komegafukuro, Sendai, Megagi Pref. Sohbe Suzuki, Sendai, and Takashige Tamamushi, Sendai, all of Japan, assignors to Olympus Optic[illegible] Co., Ltd. and Jun-Ichi Nishizawa, Sendai both of, Japan

Filed Nov. 29, 1983, Ser. No. 555,986

Claims priority, application Japan, Dec. 14, 1982, 57-217760

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—212 **8 Claims**



1. A solid state image pick-up device comprising: a plurality of picture cells, each of said picture cells comprising a first transistor and a second transistor, said first transistor comprising a gate region operating as a photoelectric conversion region and serving to read out picture cell information corresponding to photoelectric charges stored in said gate region, and said second transistor comprising a semiconductor region electrically connected to said gate region of said first transistor and serving to reset said photoelectric charges stored in said gate region to a predetermined reset state;

further comprising one semiconductor substrate, wherein said first and second transistors being formed as complementary SITs (Static Induction Transistors) on said semiconductor substrate;

wherein said first SIT comprises a buried source region of a first conductivity type provided on said substrate, a drain region of a first conductivity type provided in a surface on an epitaxial layer portion of a first conductivity type which is provided on said substrate and which forms a channel region of said first SIT, and a gate region of a second conductivity type which surrounds said drain region and has a greater depth than a depth of said drain region; and wherein the second SIT comprises source and drain regions of a second conductivity type provided in a surface of a well of a second conductivity type which is provided on said substrate adjacent to said epitaxial layer portion and which forms a channel region of said second SIT, first buried and second surface gate regions of said first conductivity type provided on said substrate and said surface of said well between said source and drain regions, respectively, said source region of said second SIT being connected to said gate region of said first SIT.

4,587,563

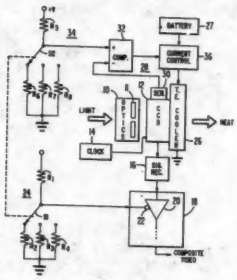
COOLER CONTROL FOR A SOLID-STATE IMAGER CAMERA

Sidney L. Bendell, Sequin, Wash., and Theodore D. Michaelis, Medford Township, Burlington County, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Sep. 28, 1984, Ser. No. 655,675

Int. Cl.[4] H04N *5/16*

U.S. Cl. 358—213 **17 Claims**



1. A solid-state imager video camera, comprising:

optical means for imaging light from an illuminated scene;

a solid-state imager responsive to light imaged by said optical means for developing output signals representative of said scene;

signal processing means including a gain-controlled amplifier for developing a video signal from said output signals;

cooling means coupled to said imager for removing heat from said imager;

thermal servo means coupled to said cooling means for regulating the cooling of said imager to a predetermined point; and

cooling control means coupled to said thermal servo means for changing said predetermined point of said thermal servo means in accordance with changes in the gain of said gain-controlled amplifier.

4,587,564

TELEVISION CAMERA MECHANICAL APPARATUS DRIVEN BY RECORDER MOTOR

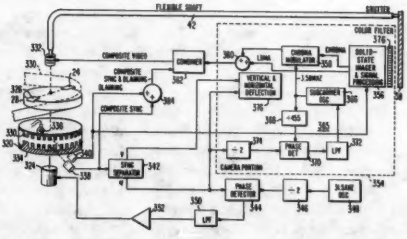
Robert A. Dischert, Burlington, N.J., assignor to RCA Corporation, Princeton, N.J.

Division of Ser. No. 330,033, Dec. 14, 1981. This application Mar. 19, 1984, Ser. No. 590,981

The portion of the term of this patent subsequent to Jun. 18, 2002, has been disclaimed.

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213 **7 Claims**



1. A television arrangement for generating television signals representative of a scene, the arrangement comprising:

solid-state image transducing means having a photosensitive area responsive to clock signals for generating charge packets in response to light from said scene reaching said photosensitive area during an image integration interval substantially corresponding to a television field trace interval, and transferring said charge packets out of said photosensitive area during a relatively shorter duration charge transfer interval which occurs after said image integration interval and within a television field retrace interval; and

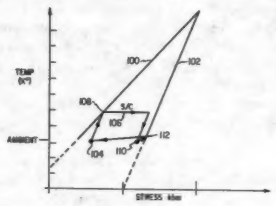
shuttering means, having an adjustable aperture for blocking substantially all light from said scene from reaching said image transducing means during said charge transfer interval and for varying the amount of light blocked from reaching said image transducing means during said image integration interval for improving the resolution of the camera when moving images are present in said scene.

4,587,565

PRESSURE SENSITIVE FILM DISPLAY HAVING MULTIPLE GRAY LEVELS

Dayton D. Eden, Dallas, Tex., assignor to LTV Aerospace and Defense Company, Dallas, Tex.

Filed Apr. 12, 1984, Ser. No. 599,460
Int. Cl.[4] H04N *3/14*
U.S. Cl. 358—235 **14 Claims**



1. A video display system having multiple gray levels, said video display system comprising:

a piezoelectric substrate;

a thin film of pressure sensitive phase change material disposed on the surface of said substrate, said material exhibiting an optically discernible phase change at any portion thereof subjected to an external pressure in excess of a predetermined threshold pressure and exhibiting hysteresis such that said optically discernible phase change at any such portion is substantially unchanged after said external pressure is removed;

first, second and third surface acoustic wave transducers disposed on the surface of said substrate for generating surface acoustic wave pulses on the surface thereof and in said film, each of said surface acoustic wave pulses having a variable pulsewidth and creating an area of pressure such that an external pressure greater than said predetermined threshold pressure is created at any point where three of said surface acoustic wave pulses intersect;

timing means coupled to said first, second and third acoustic wave transducers for initiating generation of surface acoustic wave pulses wherein three of said surface acoustic wave pulses will intersect within each of a selected plurality of regions; and

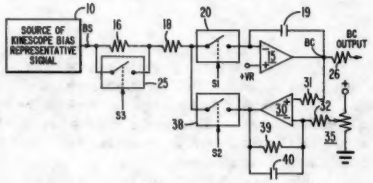
means for selectively varying the pulsewidth of said surface acoustic wave pulses wherein only a selected portion of each of said selected plurality of regions will exhibit said optically discernible phase change.

4,587,566

AUTOMATIC KINESCOPE BIAS CONTROL SYSTEM WITH MODIFIED INITIAL OPERATION

Werner Hinn, Zollikerberg, Switzerland, assignor to RCA Corporation, Princeton, N.J.

Filed May 9, 1984, Ser. No. 608,353
Int. Cl.[4] H04N *5/68, 9/20, 9/72*
U.S. Cl. 358—242 **8 Claims**



1. In a video signal processing system including an image display device for displaying an image in response to image representative video signals applied thereto, apparatus comprising:

means for energizing said system;

bias control means coupled to said display device for automatically controlling a bias condition of said display device to maintain a desired bias condition for said display device; and

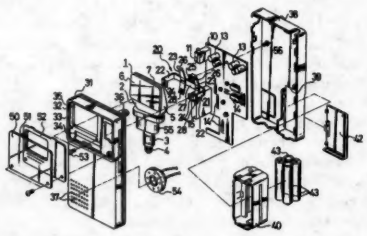
enabling means coupled to said bias control means and to said energizing means and responsive to the initial energization of said system for reducing the time otherwise required for said bias control means to initially achieve said desired bias condition with reference to the time at which said system is initially energized.

4,587,567

FLAT PICTURE TUBE TELEVISION RECEIVER INCLUDING PICTURE TUBE MOUNTING STRUCTURE

Eiji Yamamori, Tokyo, and Hiroyuki Suzuki, Inagi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 1, 1984, Ser. No. 585,079
Claims priority, application Japan, Mar. 11, 1983, 58-35239[U]; Mar. 18, 1983, 58-39246[U]; Mar. 18, 1983, 58-39247[U]
Int. Cl.[4] H04N *5/645, 5/64, 5/44;* A47B *81/06*
U.S. Cl. 358—248 **6 Claims**



1. A television receiver comprising:

a flat braun picture tube being formed of a tube portion, a funnel portion and a picture display portion, said picture display portion being coupled through said funnel surface to said tube portion, an outer rear surface of said picture display portion being inclined relative to the longitudinal axis of said tube portion such that the distal end of said rear surface relative to said funnel portion is proximate the front side of said picture display portion;

a cabinet of substantially flat rectangular parallele piped shape and of a size to enclose the whole of said flat braun tube and electronic circuits thereof;

a wiring circuit board including a conductive pattern and having thereon at least a part of said electronic circuits and disposed behind said flat braun tube substantially parallel to a longitudinal axis of said tube portion, thereby to define a space between said inclined outer rear surface of said picture display portion and said wiring circuit board for arranging therein assembly parts of said receiver of large size; and

means for supporting said flat braun tube and said wiring circuit board with a predetermined relation inside said cabinet and including a U-shaped metal support member having a distance between legs of the U substantially equal to a width of said picture display portion, elongate spring elements affixed to said U-shaped support member in mutually spaced-apart relationship and being arranged such that ends of said elongate spring elements contact a conductive coating formed on said outer rear surface of said picture tube, and an electrical conductor element for electrically connecting said spring elements to said conductive pattern on said circuit board.

4,587,568

ELECTRONIC PRINT BOARD

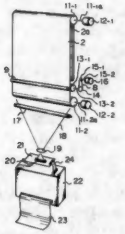
Shoichiro Takayama; Yukio Suga; Joji Tadokoro, and Yukinori Takeda, all of Tokyo, Japan, assignors to OKI Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 12, 1984, Ser. No. 588,548

Claims priority, application Japan, Mar. 18, 1983, 58-44283; Mar. 18, 1983, 58-44284

Int. Cl.[4] H04N *1/10, 1/00*

U.S. Cl. 358—293 **14 Claims**



1. An electronic print board comprising;

(a) a housing,

(b) a writing means mounted on said housing for receiving any pattern erasably written thereon with a pen means,

(c) an elongated lamp for illuminating an elongated portion on said writing means,

(d) an image sensor mounted in said housing to provide an electrical signal relating to the pattern on a scanning line which is illuminated by said lamp,

(e) means for relatively moving said image sensor to said writing means for full scanning of the pattern on said writing means,

(f) a printer for printing the pattern on said writing means with smaller size than said pattern according to said electrical signal from said image sensor, wherein said writing means is a flexible sheet which is movable by rotating a roller sandwiching said writing means, and said image sensor is fixed.

4,587,569

PRINTER FOR PRINTING MULTI-STANDARD TELEVISION SIGNALS

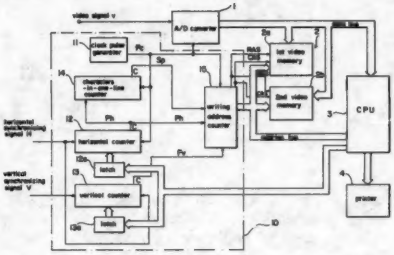
Shunichi Nakamura, Osaka, and Hiroyuki Dohi, Takatsuki, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 5, 1984, Ser. No. 617,557

Claims priority, application Japan, Jun. 8, 1983, 58-103606

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—296 **1 Claim**



1. A printer for printing T.V. signals, which comprises:

a video memory for storing T.V. signals;

a horizontal counter which starts to count clock pulses when horizontal synchronizing signals of the T.V. signals are input, and generates a horizontal pulse when the counted value becomes equal to a first predetermined value which is variable;

a vertical counter which starts to count horizontal synchronizing signals when a vertical synchronizing signal of the T.V. signals is input, and generates a vertical pulse when the counted value becomes equal to a second predetermined value which is variable;

a characters-in-one-line counter which starts to count the clock pulses when the horizontal pulse is input, and generates an operation stop signal when the counted value becomes equal to the number of printing characters in one line for the output of the printer;

a writing address counter which resets its counted value when the vertical pulse is input, delivers address signals to the video memory while counting up the number of clock pulses that occur while the horizontal pulse is input, and stops the counting-up and the generating of address signals when the operation stop signal is input;

a read-out control circuit for reading out the T.V. signals stored in the video memory; and

a printer for printing the read-out T.V. signals.

4,587,570

STYLUS KICKER HAVING KICK ENERGY MINIMIZATION MEANS

Thomas Y. Chen, Flemington; Jon K. Clemens, Skillman, and Victor Auerbach, Hamilton Sq., all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Sep. 12, 1983, Ser. No. 531,243

Int. Cl.[4] H04N *5/76;* G11B *21/08*

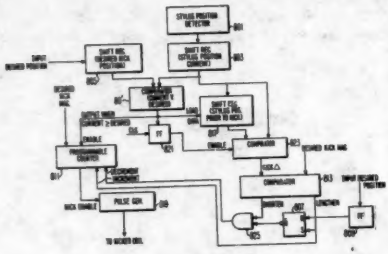
U.S. Cl. 358—342 **17 Claims**

1. In a video disc system having a transducer for reproducing information signals recorded in a continuous track in a record medium, an apparatus comprising:

kicker means, responsive to a control signal for initiating a given play mode for effecting translation of said transducer such that said transducer is kicked to effect said play mode, said translation of said transducer tending to cause damage to said track during said given play mode; and

drive means for supplying energy to said kicker means to effect said translation of said transducer in said given play mode, said drive means, responsive to the initiation of said

control signal, being decremented to reduce the energy to said kicker means on each successive translation until said energy is insufficient to effect transducer translation thereafter said drive means being incremented to increase the



energy to said kicker means until said energy is of a minimum value sufficient to effect said translation to reduce said tendency of said transducer to damage said track during said given play mode.

4,587,571

READ AND ERASE DEVICE

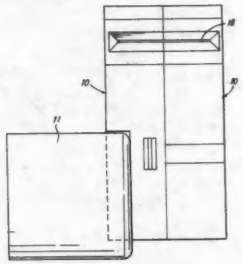
Alan F. Anderson, Horley, and Robert W. Easterby, Dartford, both of England, assignors to Mainmet Limited, Bradford, England

Continuation of Ser. No. 458,151, Jan. 14, 1983, abandoned. This application Jun. 10, 1985, Ser. No. 742,382

Claims priority, application United Kingdom, Jan. 29, 1982, 8202639

Int. Cl.[4] G11B *25/04;* **G06K** *13/06, 13/063*

U.S. Cl. 360—2 **12 Claims**



1. Apparatus for reading magnetically encoded information on a ticket or card, comprising a compact casing having an entry slot, an exit slot, and first and second internal wall portions defining therebetween within the casing a substantially continuously curved path connecting the entry and exit slots for a ticket or card inserted into the entry slot, the first wall portion defining an inner curvature of the curved path and the second wall portion defining an outer curvature of the curved path; a read head located within the second wall portion at the outer curvature of the path for reading the magnetically encoded information on the ticket or card; a drive roller and a pinch roller in engagement with one another and disposed along the path for conveying the ticket or card from the entry slot past the read head; an electric drive motor for driving the drive roller; and a projection formed as part of said first internal wall portion defining a constriction in the path adjacent to the read head.

4,587,572

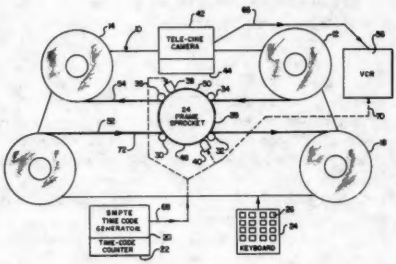
FILM TO TAPE TRANSFER SYSTEM

Edmond DiGiulio, Malibu, Calif., assignor to Cinema Products Corporation, Los Angeles, Calif.

Filed Apr. 14, 1983, Ser. No. 484,854

Int. Cl.[4] H04N *5/782*

U.S. Cl. 360—14.3 **23 Claims**



1. A film to tape transfer system comprising

a console;

means operatively associated with the console for drawing a camera negative film having a magnetic coating across the console;

means operatively associated with the console for drawing a sound track film having a magnetic coating across the console;

transfer means operatively associated with the console and configured to receive the camera negative film and the sound track film, and adapted to produce a videotape recording of the camera negative film and the sound track film as the camera negative film and the sound track film are drawn across the console;

means for generating a time code signal; and

recording means operatively associated with the time code generator means and the transfer means to simultaneously provide a time code signal upon the magnetic coating of the camera negative film, upon the magnetic coating of the sound track film and upon the videotape recording.

4,587,573

CODED SIGNAL REPRODUCING APPARATUS

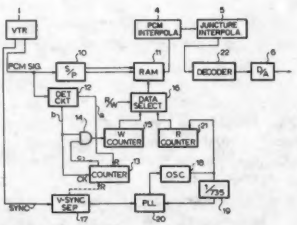
Kentaro Odaka, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 289,234, Aug. 3, 1981, abandoned. This application May 23, 1984, Ser. No. 612,959

Claims priority, application Japan, Aug. 6, 1980, 55-107936

Int. Cl.[4] H04N *5/783*

U.S. Cl. 360—10.3 **16 Claims**



10. A coded signal reproducing system for reproducing pulse code modulated signal from a recording medium in which PCM data and reference signals are recorded at a nor-

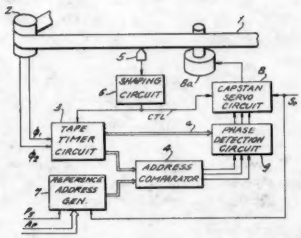
mal speed on slant tracks for a rotary head tape recorder, comprising said rotary head recorder producing said PCM data together with said reference signals, a detecting circuit receiving the output of said rotary head recorder and detecting said reference signals and producing outputs, a random access memory receiving the output of said rotary head recorder and in which said PCM data are to be written and read out under the control of a read and write address circuit, a counter circuit receiving outputs of said detecting circuit and counting a predetermined number of said PCM data, said predetermined number being equal to the number of data recorded in one synchronizing period of said PCM data at the normal speed and said predetermined number of PCM data being written in said random access memory, said counter circuit connected to said random access memory and data read out of said random access memory so as to compress or expand the time base of said predetermined number of PCM data to one synchronizing period.

4,587,574

TAPE ADDRESS SYNCHRONIZING APPARATUS FOR VIDEO TAPE RECORDER

Tetsuo Tsurubuchi; Toru Sekiguchi, and Shigeru Araki, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed May 22, 1984, Ser. No. 612,685
Claims priority, application Japan, May 23, 1983, 58-90175
Int. Cl.[4] H04N *5/782*
U.S. Cl. 360—14.3 **11 Claims**



1. A video tape recorder magnetic tape synchronizing apparatus for synchronizing said magnetic tape to a reference signal, said apparatus comprising:

capstan servo means for controlling the speed of a capstan motor which determines a playback speed for said magnetic tape, said capstan servo means including means responsive to a first and a second acceleration signal and a first and second deceleration signal for accelerating or decelerating, respectively, said tape playback speed;

means for producing tape addresses in synchronism with said tape playback speed, each said tape addresses corresponding to a respective video frame of said tape;

means for producing a plurality of auxiliary addresses, each said auxiliary address corresponding to a respective segment of said respective video frame;

means for producing reference addresses in synchronism with said reference signal;

means for comparing said reference addresses and said tape addresses and for generating said first acceleration and first deceleration signals, said signals being produced to control said playback speed to ensure that said reference and said tape addresses are synchronized; and

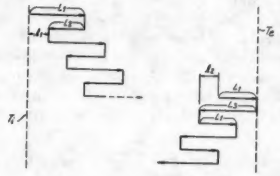
auxiliary address comparing means for comparing said auxiliary addresses to a predetermined value and for generating said second acceleration and said second deceleration signals for further synchronizing said tape addresses to said reference signal, said auxiliary address comparing means being operative only when any of said tape addresses is equal to a corresponding one of said reference addresses.

4,587,575

METHOD AND APPARATUS FOR UTILIZING A DRIVE TAPE

Yoichi Odagiri, and Tsuguo Sato, both of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 27, 1984, Ser. No. 574,536
Claims priority, application Japan, Jan. 31, 1983, 58-14334
Int. Cl.[4] G11B *5/86, 15/32*
U.S. Cl. 360—15 **20 Claims**



1. A method of driving a first master magnetic recording tape having signals recorded thereon and a second copy magnetic recording tape using a drive tape pressed together with said first and second tapes, the method comprising:

advancing said drive tape from a first starting point to advance said first and second tapes; and

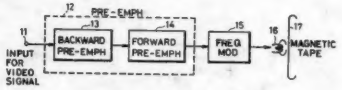
rewinding said drive tape to a second starting point on said drive tape located in advance of said first starting point.

4,587,576

VIDEO SIGNAL PROCESSING APPARATUS WITH PRE-EMPHASIS AND DE-EMPHASIS FOR USE IN A RECORDING AND REPRODUCING SYSTEM

Akira Hirota, Chigasaki, and Yutaka Ichinoi, Yokohama, both of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Sep. 22, 1983, Ser. No. 534,638
Claims priority, application Japan, Sep. 25, 1982, 57-166800
Int. Cl.[4] H04N *5/782*
U.S. Cl. 360—33.1 **16 Claims**



1. A video signal processing system for application in a recording and reproducing system which records a video signal onto a recording medium and reproduces the recorded video signal from the recording medium, said video signal processing system comprising:

pre-emphasis means for emphasizing a high frequency component of a recording video signal which is to be recorded relative to a low frequency component of the recording video signal; and

de-emphasis means for suppressing a high frequency component of a reproduced video signal which is reproduced from said recording medium relative to a low frequency component of the reproduced video signal,

said pre-emphasis means comprising a forward type pre-emphasis circuit for weighting a past input video signal which was supplied to said forward type pre-emphasis circuit at a past time relative to an input time when an input video signal is being supplied thereto, and for producing an output video signal by adding the weighted past input video signal to the input video signal which is being supplied, and a backward type pre-emphasis circuit for weighting a future input video signal which was supplied to said backward type pre-emphasis circuit at a subsequent time relative to an output time when an output video signal is being produced, and for producing the output

video signal by adding said weighted future input video signal to the video signal of the output time,

said de-emphasis means comprising a forward type de-emphasis circuit for weighting a past input video signal which was supplied to said forward type de-emphasis circuit at a past time relative to an input time when an input video signal is being supplied thereto, and for producing an output video signal by adding the weighted input video signal to the input video signal which is being supplied, and a backward type de-emphasis circuit for weighting a future input video signal which was supplied to said backward type de-emphasis circuit at a subsequent time relative to an output time when an output video signal is being produced, and for producing the output video signal by adding the weighted future input video signal to the video signal of the output time.

4,587,577

TAPE POSITION DATA RECORDING AND REPRODUCTION METHOD

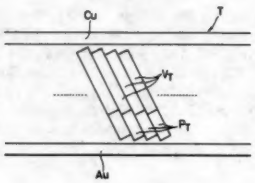
Taiji Tsunoda, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

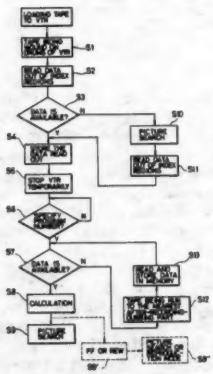
Filed Feb. 11, 1985, Ser. No. 700,237

Claims priority, application Japan, Feb. 10, 1984, 59-21861; Feb. 24, 1984, 59-32672; Feb. 29, 1984, 59-36088

Int. Cl.[4] G11B *27/30*

U.S. Cl. 360—72.2 **4 Claims**





1. A tape position data recording method, comprising the steps of:

recording video program data in video tracks on a video tape; and

recording position data related to a present program and position data related to at least one preceding program repeatedly in digital data recording tracks on extensions of video tracks in which said programs have been recorded.

4,587,578

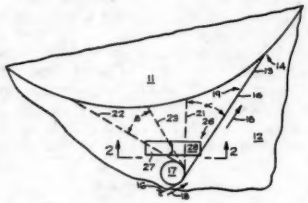
DIRECTIONAL CONTROL FOR TAPE REEL

Stephen R. desJardins, Mt. View, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Apr. 8, 1983, Ser. No. 483,314

Int. Cl.[4] G11B *15/48*

U.S. Cl. 360—74.1 **8 Claims**



1. A directional control for the drive motor of an information storage unit of the type including a tape coiled on a reel in one of two coiling directions and respective tape paths, wherein:

a directional control means is provided having first and second conditions in which said motor is energized for rotation in opposite directions; and

interfering means associated with said control means and said unit and responsive to the condition of said control means to block a first tape path and clear a second tape path, in accordance with the coiling direction of said tape on said reel.

4,587,579

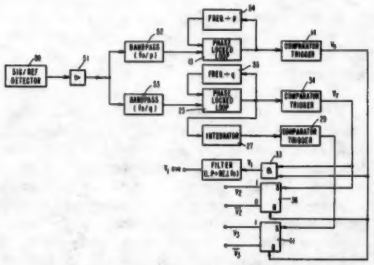
SYSTEM FOR POSITION DETECTION ON A ROTATING DISK

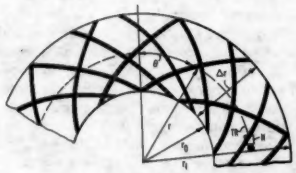
John Cocke, Bedford, and Thomas H. DiStefano, Bronxville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1982, Ser. No. 454,745

Int. Cl.[4] G11B *5/55*

U.S. Cl. 360—75 **4 Claims**





1. A magnetic disk recording system including

a magnetic recording head, a servo control system for said head,

a magnetic recording medium including a set of circular data rings formed concentrically on said magnetic recording medium,

a set of spiral radial-position-encoding patterns which are detectable on said medium including signal patterns and reference patterns for position encoding,

detector means for detecting the signal and reference patterns on said medium,

means comprising a reference phase locked loop and a position phase locked loop connected to receive reference signals and position signals respectively, a plurality of comparator trigger circuits including a reference comparator trigger, a position comparator trigger, and an integrated position comparator trigger, with said position signal also passing to an integrator connected to a third phase locked loop, with each of said phase locked loops having its output connected to the corresponding one of said comparator trigger circuits,

said trigger circuits being connected to a pair of flip flop circuits, and an AND gate, said flip flop circuits being connected to a plurality and AND gates and an up down counter.

4,587,580

VIDEO SIGNAL REPRODUCING APPARATUS

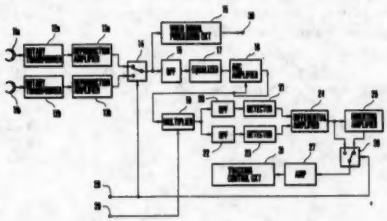
Nobutoshi Takayama, Kawasaki; Hiroo Edakubo, Tokyo, and Hiroyuki Takimoto, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 10, 1984, Ser. No. 569,781

Claims priority, application Japan, Jan. 11, 1983, 58-2641; Apr. 20, 1983, 58-70592

Int. Cl.⁴ G11B *5/45, 5/56*

U.S. Cl. 360—77 **24 Claims**



1. A video signal reproducing apparatus for reproducing a video signal from a recording medium having adjacent tracks with recordings of video signals and recordings of pilot signals of different frequencies superposed on the video signal, comprising:

a reproducing head for tracing each of the tracks for reproducing a video signal, said head having a given frequency characteristic;

signal processing means for obtaining a tracking control signal in accordance with pilot signals obtained from said reproducing head; and

means for compensating for the influence on the tracking control signal of the frequency characteristic of said reproducing head in the frequency band of the pilot signals.

4,587,581

MAGNETIC TAPE TRACKING CONTROL APPARATUS

Joseph J. Serafini, LaVerne, Calif., assignor to Datatape, Inc., Pasadena, Calif.

Filed Jan. 7, 1985, Ser. No. 689,406

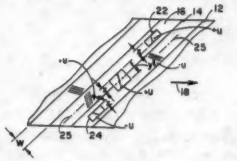
Int. Cl.⁴ G11B *5/56*

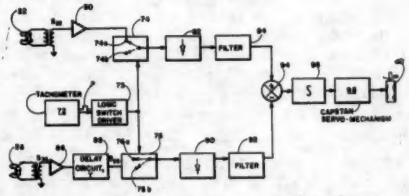
U.S. Cl. 360—77 **9 Claims**

1. In apparatus for playback of information recorded on a magnetic storage device, said apparatus having servomechanism means, responsive to a tracking error signal, for aligning a playback head with respect to alternating record tracks of the storage device having information recorded at an azimuth angle which corresponds to the azimuth angle of said playback head but which is different from the azimuth angle of information recorded on the adjacent record tracks, the improvement comprising:

(a) said playback head having a track-wise width that is less than the width of its associated record track, to prevent the attenuating of its playback signal as the result of limited misalignment of said playback head relative to a reference line of its associated record track;

(b) a tracking control head mounted in fixed spatial relationship with respect to said playback head wherein said tracking control head (1) overlaps the record track associated with said playback head a predetermined amount





when said playback head is aligned with respect to the reference line of its associated record track, and (2) overlaps the track associated with said playback head a variable amount in accordance with the magnitude and the direction of misalignment of said playback head with respect to the reference line of its associated record track, said control head having an azimuth angle corresponding to said playback head, whereby said control head produces a tracking control signal having an amplitude which is proportional to the amount which said control head overlaps the record track associated with said playback head; and

(c) comparator means for producing the aforementioned tracking error signal in accordance with the difference between the amplitude of the tracking control signal and the amplitude of the playback signal of said playback head.

4,587,582

MAGNETIC TAPE RECORDER/PLAYER

Tadashi Iwamoto, Yotsukaido, and Kimihide Tokura, Yokohama, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Feb. 14, 1983, Ser. No. 466,312

Claims priority, application Japan, Feb. 15, 1982, 57-22525

Int. Cl.⁴ G11B *5/008, 15/00*

U.S. Cl. 360—93 **12 Claims**

1. A magnetic tape recorder/player comprising:

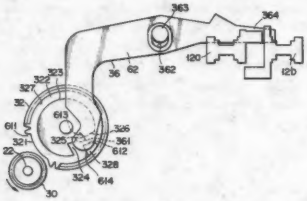
a first rotor adapted to be rotated regardless of whether or not magentic tape is being transported;

a second rotor having a first peripheral part engagable with

said first rotor to permit a rotary force to be transmitted from the first rotor to the second rotor and a second peripheral part not engagable with said first rotor so that when the second rotor is in a predetermined annular positon relative to the first rotor the rotary force is not transmitted from the first to the second rotor;

a lock member having an engaging portion;

means for driving said lock member in a predetermined direction;



a guide section formed on said second rotor, said guide section being adapted so that when the lock member moves in said predetermined direction to a first position the guide section engages with said lock member engaging portion so that when the lock member is driven, the second rotor is rotated so as to engage with said first rotor and when said lock member is at a position different from the first position it causes the second rotor to stop;

a magnetic tape recorder/player mechanism adapted to obtain a predetermined operating state by a rotary force of said second rotor.

4,587,583

TAPE PLAYER

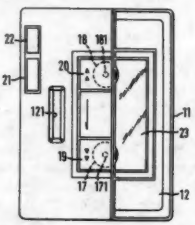
Seiji Tomita, Yokosuka, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Nov. 1, 1982, Ser. No. 438,352

Claims priority, application Japan, Nov. 6, 1981, 56-178164; Mar. 10, 1982, 57-37744; May 17, 1982, 57-82673

Int. Cl.[4] G11B *5/008, 15/00*

U.S. Cl. 360—93 **16 Claims**



1. Apparatus for controlling movement of tape disposed on at least one reel, said reel defining a hole therethrough, said apparatus comprising:

a chassis;

a moving member mounted on said chassis and adapted for cooperation with said hole for rotating said reel, said member being rotatable about an axis and slidable along said axis; receiving means, pivotally attached to said chassis, for supporting said reel for movement toward and away from said chassis;

means for rotating said moving member when said moving member is slid in one direction; and

means for stopping said rotating means from rotating said moving member in direct response to manual pivoting of said receiving means away from said chassis;

5. Apparatus for controlling movement of tape disposed on a pair of reels, each of said reels defining a hole therethrough, said apparatus comprising:

first and second moving members, one adapted for cooperation with each of said holes, respectively, for rotating said reels, said members being rotatable about first and second axes, respectively, and slidable along said first and second axes, respectively;

first means for rotating said first moving member in a predetermined direction when said first moving member is slid in one direction from a first position;

second means for rotating said second moving member in a direction opposite the rotation of said first moving member when said second moving member is slid in said one direction from a first position; and

releasing means for returning said second moving member to said first position and stopping said second rotating means from rotating said second moving member when said first moving means is slid in said one direction, and for returning said first moving member to said first position and stopping said first rotating means from rotating said first moving member when said second moving means is slid in said one direction.

6. Apparatus according to claim 5, wherein said first and second rotating means are mechanically coupled to said first and second moving member, respectively, to cause said first and second rotating means to rotatably drive said first and second moving member, respectively, when the corresponding one of said moving members is manually actuated in said one direction.

4,587,584

REWIND LEVER FOR A RECIPROCATING TYPE TAPE RECORDER

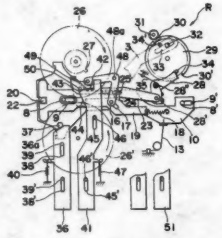
Kunio Tutino, Tottori, Japan, assignor to Sanyo Electric Co., Ltd. and Tottori Sanyo Electric Co., Ltd., both of Tottori, Japan

Filed Sep. 24, 1982, Ser. No. 423,075

Claims priority, application Japan, Sep. 25, 1981, 56-152369

Int. Cl.[4] G11B *17/00, 15/43*

U.S. Cl. 360—96.3 **3 Claims**



1. In a reciprocating type cassette tape recorder for use with a magnetic tape cassette accommodating therein a magnetic tape, which comprises a magnetic head means, a pair of pinch rollers selectively brought into pressure contact with a pair of capstans, a magnetic tape driving mechanism for driving the magnetic tape selectively in first and second directions, and means for changing over said magnetic tape driving mechanism further including a first gear normally driven for rotation by a driving means, a magnetic tape driving mechanism change-over lever associated with said magnetic tape driving mechanism for the changing-over of the tape direction, a second gear so engaged with said first gear and the magnetic tape driving mechanism change-over lever as to cause said magnetic tape driving change-over lever to pivot from one position to another, and a stopper lever for preventing said second gear

from rotation, the improvement comprising a rewind lever formed with first and second taper edges, and an actuating stepped portion, so that upon depression of said rewind lever for actuation, said first taper edge controls said stopper lever so as to change-over the running direction of the magnetic tape from the first direction to the second direction, with said actuating stepped portion simultaneously causing the pinch roller to disengage from the capstan and upon restoration of said rewind lever for releasing, said second taper edge controls said stopper lever so as to again change-over the running direction of the magnetic tape from the second direction to the first direction, with said actuating stepped portion simultaneously causing the pinch roller to engage the capstan.

4,587,585

LOADING/EJECTING DEVICE FOR A MAGNETIC DISK CARTRIDGE

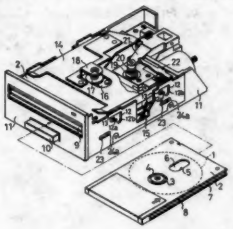
Motohiro Shimaoka, and Yukio Saito, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Dec. 21, 1983, Ser. No. 564,073

Claims priority, application Japan, Dec. 21, 1982, 57-192130[U]

Int. Cl.⁴ G11B *5/012, 23/03*

U.S. Cl. 360—97 **7 Claims**



1. A loading/ejecting device for magnetic disk carriage comprising a housing frame, a cartridge holder for holding a cartridge inserted therein, a detector means for detecting a closed state of a magnetic head insertion aperture opening and closing shutter in the cartridge when it is inserted in the cartridge holder in a predetermined position, and a load stopping means for stopping the cartridge from assuming a loaded state upon detection of the closed state of said shutter by said detector means, said cartidge holder being provided with a pivotable lever one endof which is capable of abutting said cartridge and serving as said detector means, and the other end of which is engageable with housing frame and is provided with an abutting portion for abutting a shutter operating portion of the cartidge to prevent the pivotal movement of said lever and thereby serving as said load stopping means.

4,587,586

DISK POSITIONING MECHANISM FOR FLEXIBLE MAGNETIC DISK DRIVE APPARATUS

Kunio Hamanaka, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Apr. 1, 1983, Ser. No. 481,233

Claims priority, application Japan, Apr. 5, 1982, 57-56269

Int. Cl.⁴ G11B *25/04*

U.S. Cl. 360—99 **1 Claim**

1. A disc drive apparatus comprising:

a housing having an opening at a front end thereof through which a disc can be inserted;

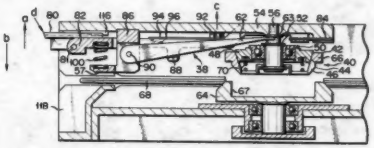
a door rotatably supported by a horizontal shaft and movable between open and closed positions;

spindle means for rotating said disc around a vertical axis substantially perpendicular to said horizontal axis;

a disc clamper assembly means, rotatable about said vertical axis and movable along said vertical axis, for holding said disc between said disc clamper assembly and said spindle;

link mechanism means for interlocking said door and disc clamper assembly and causing said disc clamper assembly to hold said disc between said spindle and disc clamper assembly responsive to said door being in said closed position, said link mechanism including a door lever having front and rear portions and a projection protruding downward from an intermediate portion thereof, and a clamper hanger having front and rear portions, the door lever being swingably fitted at its rear portion to a first portion of an upper wall of said housing in a vicinity of said disc clamper assembly, and connected at its front portion to the door by means of said horizontal shaft; and

spring means for biasing, in an upward vertical direction, said door lever front portion, to always bring at least one upper edge portion of said door into contact with a second



portion of said housing upper wall, whereby said door lever front portion is vertically moved by the opening/-closing of said door,

said clamper hanger being rotatably supported at its front portion with a horizontal shaft held by the housing at a position between said door and said door lever projection, and engaged at its rear end with the clamper hanger to vertically move said disc clamper assembly,

said clamper hanger being engaged at an under side thereof with said door lever projection fixed to said door lever for pushing said clamper hanger in an upward vertical direction, whereby when the door is opened, said door lever front end moves upward and said clamper hanger is pushed upward by said projection, causing said clamper hanger rear end to move upward for releasing said disc clamped between a disc clamper assembly and said spindle.

4,587,587

DUAL TRANSDUCER ASSEMBLY WITH LINEAR ADJUSTMENT

John H. Miller, San Jose, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 29, 1983, Ser. No. 518,783

Int. Cl.⁴ G11B *5/54*

U.S. Cl. 360—109 **5 Claims**

1. An adjustable dual transducer assembly affording substantially linear adjustment over a predetermined range, said assembly comprising:

first and second arm members each having a transducer mounting end and another end;

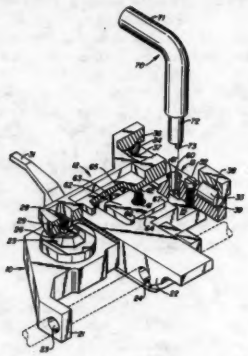
slide block means slidably mounted on said first arm member;

means for pivotally mounting said second arm member on said slide block means;

means for releasably locking the relative positions of said arm members and said slide block means; and

adjustment means for providing substantially linear relative positional adjustment between said first and second arm members, said adjustment means including means on said first arm member for providing a linear guide path, means on said slide block means for contacting said guide path, a bearing slot formed in said first arm member adjacent said other end, and a bearing aperture formed in said slide block means for exposing said slot to receive an eccentric

pin on a crank and for providing a bearing surface for a shank portion of said crank so that rotation of said shank



provides a translational force between said first and second arm members.

4,587,588

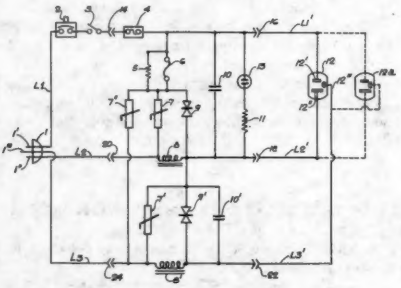
POWER LINE TRANSIENT SURGE SUPPRESSOR

Richard Goldstein, Northbrook, Ill., assignor to Perma Power Electronics, Inc., Chicago, Ill.

Filed Mar. 2, 1984, Ser. No. 585,853

Int. Cl.[4] H02H *9/00*

U.S. Cl. 361—54 **24 Claims**



1. In a power line surge suppressor having first and second input terminals for connection to high and low or return lines of electrical power mains, first and second output terminals for connection to loads to be protected, first and second load power conductor means coupled between said first input and output terminals and said second input and output terminals respectively for transfer of electrical power therebetween, and a first surge suppression means coupled across said first and second conductor means, said first surge suppression means having the property of presenting a reduced impedance to line voltage surges above a given threshold value so as to bypass surge currents through said first suppression means, the improvement comprising:

thermal cut-out means having a temperature-responsive switch means, said switch means being operable from a normally closed position to a circuit breaking condition when the temperature thereof exceeds a given threshold value, said switch means being inserted in series with one of said conductor means so as to terminate said power flow when in an open condition, and a resistance heating element in thermal contact with said switch means;

electrical current interrupting fuse means coupled to said first surge suppression means so that said bypass surge currents pass through said fuse means, said fuse means having a blowout value chosen to withstand said bypass surges and to blow only at current values corresponding to a short circuit failure condition in said first surge suppression means, said resistance element being connected in parallel to said fuse means so that upon blowing of said fuse means the current thereafter flowing through said resistance element heats said element to open said switch means.

4,587,589

VOLTAGE LIMITING FEED-THROUGH UNIT

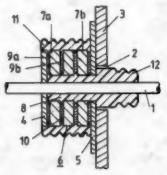
Alois Marek, Untersiggenthal, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Mar. 20, 1984, Ser. No. 591,339

Claims priority, application Switzerland, Mar. 21, 1983, 1515/83

Int. Cl.[4] H02H *3/22*

U.S. Cl. 361—56 **5 Claims**



1. Voltage limiting feed-through unit of axisymmetrical design comprising:

a cylindrical conductor for passing through an opening of an electrically conductive wall, said conductor being insulated from said wall opening;

plural identical shunt elements serial aligned to form a shunt row, each shunt element formed of a varistor material with a central hole through which the conductor extends, each shunt element having first and second parallel contact surfaces with conductive coatings on said surfaces;

a first of said shunt elements having its first contact surface in an electrically conductive connection to said conductor;

a last of said shunt elements having its second contact surface in a location for an electrically conductive connection to said wall;

the shunt element adjacent the first shunt element having its first contact surface in electrically conductive relationship with the second contact surface of the first shunt element, and each successive shunt element thereafter having its first contact surface in electrically conductive relationship with the second contact surface of the preceding shunt element; and

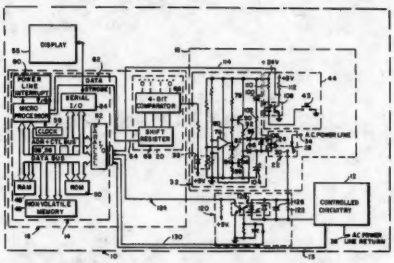
isolating means separating the contact surfaces common to two successive shunt elements from the cylindrical conductor and the electrically conductive wall.

4,587,590

MICROCOMPUTER DRIVEN FAIL-SAFE DEVICE WITH SHORT CIRCUIT DETECTION FOR ELECTRONIC CONTROL CIRCUITRY

John L. Bala, Amherst, N.H.; Michael McCarron, Medford, and Richard E. Zapolin, Lexington, both of Mass., assignors to Electronics Corporation of America, Cambridge, Mass.

Filed Feb. 15, 1984, Ser. No. 580,475
Int. Cl.[4] H02H *3/093*
U.S. Cl. 361—94 **21 Claims**



1. A fail-safe device for removing power, supplied by a power line, from circuitry to be controlled upon occurrence of an undesired operating condition, said device comprising:

means for generating a fail-safe signal which normally varies between signal levels at a frequency in a predetermined range between a minimum and a maximum frequency unless there is an undesired operating condition;

power control means, connected to said generating means, for supplying power to said controlled circuitry only when the output of said generating means has a frequency in said predetermined range;

heat limiting means, connected in series between said power control means and said controlled circuitry, having a resistance that is significantly reduced when a high current heats said heat limiting means;

shunt means, connected in parallel with said heat limiting means for receiving current when a high current passes through said heat limiting means and for sending a signal to said generating means in response to receiving said high current; and

said generating means including timer means initiated by a signal from said shunt means for counting a predetermined period of time so that upon expiration of said predetermined period of time, an undesired operating condition is indicated if a signal is still being received from said shunt means.

4,587,591

POWER SUPPLY FOR OZONE GENERATOR

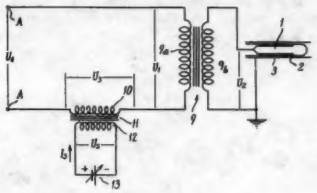
Maurice Adatto, Paris, and Christian Coste, Versailles, both of France, assignors to Degremont, Hauts de Seine, France

Filed Sep. 5, 1984, Ser. No. 647,826
Claims priority, application France, Sep. 23, 1983, 83 15139
Int. Cl.[4] C01B *13/10*
U.S. Cl. 361—235 **1 Claim**

1. A power supply for supplying a high AC voltage to an ozone generator from a low voltage AC source, said supply comprising:

a magnetic-leakage type transformer and a saturable core inductor, said transformer having a primary winding which is connected in series with a first winding of said inductor and the series combination connected to said low voltage AC source, a secondary winding of said transformer being connected to said ozone generator;

said inductor having a second winding which is supplied with a continuous DC current so as to control the inductance value of said inductor by varying the amount of saturation of said saturable core of said inductor;



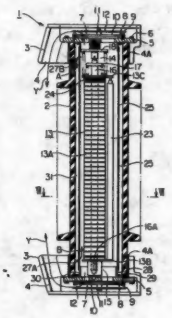
wherein the magnitude of said high AC voltage supplied to said ozone generator is varied in accordance with the magnitude of said continuous DC current.

4,587,592

ZINC OXIDE LIGHTNING PROTECTOR

Kouichi Nakano, Ibaraki; Seiichi Maruyama, Hitachi; Seizo Nakano, Mito, and Masatomo Sato, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 24, 1984, Ser. No. 653,548
Claims priority, application Japan, Sep. 26, 1983, 58-178971
Int. Cl.[4] H02H *3/22*
U.S. Cl. 361—127 **5 Claims**



1. A zinc oxide lightning protector comprising an insulation cylinder arranged in an insulator having cover plates mounted at both ends of the insulator, and a zinc oxide element section arranged in said insulator cylinder, said zinc element oxide section being cooled by gas flowing from an inlet port to an exhaust port formed at the insulation cylinder said zinc oxide element section is arranged eccentrically on one side of said insulation cylinder.

4,587,593

INTEGRALLY CAST MOBILE RADIO HOUSING

James P. Liautaud, River and Bluff Rds., Trout Valley, Cary, Ill. 60013; Peter F. Stultz, Elgin, and David L. Maloney, Barrington, both of Ill., assignors to James P. Liautaud, Cary, Ill.

Filed Sep. 6, 1983, Ser. No. 529,858
Int. Cl.[4] H05K *7/20, 5/06*
U.S. Cl. 361—383 **6 Claims**

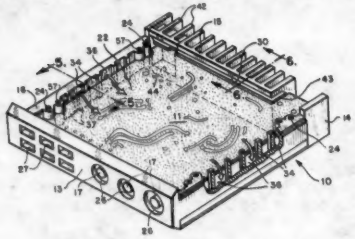
1. An electronic equipment housing comprising:

a circuit board having electrical circuitry thereon which dissipates heat;

a housing member having a plurality of side walls defining a compartment having an opening at one end for receiving said circuit board;

cover means overlying said opening to close said compartment; and

mounting means mounting said circuit board within said compartment said mounting means including a plurality of ribs integrally formed in said housing member in the inside surface of at least one of said side walls, each of said ribs



projecting from said inside surface into engagement with the periphery of said circuit board so as to space said circuit board from said surface to form a plurality of convective air passages between said circuit board and said surface allowing air to flow from one side of said circuit board to the other.

4,587,594

ELECTRICAL CIRCUIT ASSEMBLIES

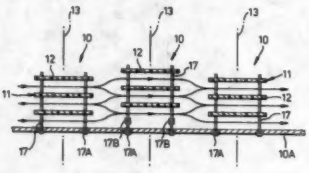
Hugh McPherson, West Linton, Scotland, assignor to Ferranti, PLC, Cheshire, England

Filed Jun. 14, 1983, Ser. No. 504,321

Claims priority, application United Kingdom, Jun. 19, 1982, 8217817

Int. Cl.[4] H05K *7/20*

U.S. Cl. 361—383 **19 Claims**



1. An electrical circuit assembly comprising a plurality of stacks on a common, at least generally, planar support, each stack having a plurality of at least substantially identically constructed modules, each such module, at least partially, being held in its required location in the associated stack by a plurality of members extending parallel to the longitudinal axis of symmetry of, and at least wholly along, the stack, each module including an, at least substantially, planar substrate, the substrate extending at right angles to the longitudinal axis of symmetry of the stack, the longitudinal axis of symmetry of each stack being at right angles to the, at least general, plane of the common support, the assembly having constituent elements of a circuit on at least one major surface of each substrate, the circuit being completed by electrical interconnections between the modules of each stack, and between each stack, terminals being provided for each stack of the electrical circuit assembly, and in each stack adjacent pairs of substrates are spaced apart, the arrangement being so that a cooling fluid flows between the adjacent pairs of substrates, through each stack, in planes generally at right angles to the longitudinal axes of symmetry of the stacks, and the cooling fluid flows, sequentially, through at least two of the stacks, and in which, in relation to at least an adjacent pair of stacks of the electrical circuit assembly, the arrangement being such that through both stacks of the adjacent pair the cooling fluid is to flow in turn, the spaced substrates of one stack of the adjacent pair are in staggered relationship to the spaced substrates of the other stack of the adjacent pair.

4,587,595

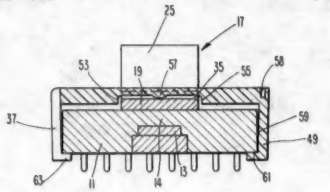
HEAT SINK ARRANGEMENT WITH CLIP-ON PORTION

James F. Staples, Westford, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Sep. 6, 1983, Ser. No. 529,839

Int. Cl.[4] H05K *7/20*

U.S. Cl. 361—388 **7 Claims**



1. A clip-on heat sink arrangement conducting heat from an element which generates heat and which element is held in a holder means having a plurality of edges and which holder means has a heat transfer section which overlies said element, comprising in combination: heat sink means formed of material which readily conducts heat, said heat sink means having, (1) a contact section means to come in substantial contact with said heat transfer section of said holder and (2) a heat dissipating section formed to pass heat to ambient air, said dissipating section further having means for securing a clip-on means thereto; a clip-on means having an underside and (1) being resilient and (2) having a plurality of clip-on tab means which are formed and disposed to fit around certain sections of said edges of said holder means; protruding means disposed on said underside of said clip-on means; and said clip-on means secured by said means for securing to said heat dissipating section, whereby when said tabs of said clip-on means are fitted around said certain sections of said edges of said holder means, said protruding means provides pressure against said contact section to cause it to come into substantial contact with said heat transfer section of said holder in order to conduct heat from said element.

4,587,596

HIGH DENSITY MOTHER/DAUGHTER CIRCUIT BOARD CONNECTOR

Edward D. Bunnell, Palm Harbor, Fla., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 9, 1984, Ser. No. 597,982

Int. Cl.[4] H05K *1/18*

U.S. Cl. 361—398 **9 Claims**

1. A high density mother/daughter circuit board connector comprising:

an elongated housing defining a mother circuit board engaging face and an oppositely-directed elongated daughter circuit board receiving recess at least one elongated side of which is profiled to form a cam reaction surface;

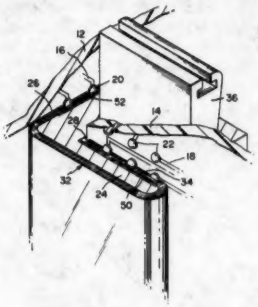
elongated cam means in said recess engaging said cam reaction surface;

means to drive said elongated cam means with respect to said cam reaction surface;

a multi-layer flexible circuit wrapped around said housing from said face to extend into said recess and defining a plurality of circuit paths each with a contact point at said face and in said recess;

conductors on a plurality of individual layers of said multi-

layer flexible circuit extending between first and second contact points; and



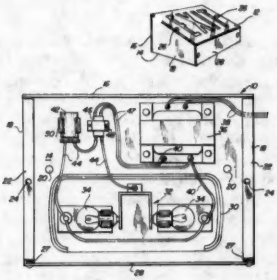
projections on said mother and daughter boards for electrically contacting the contact points.

4,587,597

EMERGENCY EXIT LIGHT OR THE LIKE

Charles J. Meyers, 474 Lake Ave., Woodstock, Ill. 60098

Filed Nov. 19, 1984, Ser. No. 673,472
Int. Cl.⁴ G09F *13/04*
U.S. Cl. 362—20 **7 Claims**



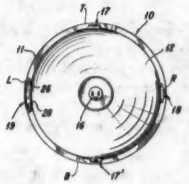
1. An emergency light for illuminating an emergency object such as an exit door, comprising a box to be mounted on a vertical supporting surface above the emergency object, said box having a vertical rear wall for attachment to such surface, a horizontal top wall, and a pair of trapezoidal shaped sidewalls having a major depth dimension at the top and a minor depth dimension at the bottom, said walls being unitary and formed of opaque material, said trapezoidal shaped sidewalls defining a downwardly and rearwardly inclined front face and a horizontal bottom face on the box, said sidewalls each having inturned flanges on the front and bottom edges thereof; front and bottom walls for said box formed of light emitting material and removably secured to said inturned flanges for closing the front and bottom faces of said box, said front and bottom walls being removable to facilitate access to the interior of said box; a pair of low voltage light bulbs mounted on said rear wall within the interior of said box with their axes substantially aligned and parallel with said rear wall and their light emitting bulbs spaced apart for illuminating the entirety of said front and bottom walls, and low voltage power source means mounted on said rear wall within the interior of said box for illuminating said bulbs, said bulbs being connected in parallel for simultaneous illumination whereby, upon failure of either one of said bulbs, the emergency light remains functional but a warning is conveyed to replace said bulbs; said light emitting front wall bearing an emergency directive; said light bulbs, upon illumination thereof, illuminating said front wall to illuminate the directive thereon and casting light forwardly and downwardly through said front wall and downwardly through said bottom wall to illuminate the emergency object and surrounding area to facilitate location of and access to the object.

4,587,598

UNIVERSAL HEADLIGHT

Bruce E. Burgess, Silver Spring, and Joel C. Gorick, Potomac, both of Md., assignors to Candlepower Inc., Rockville, Md.

Filed Nov. 21, 1984, Ser. No. 673,723
Int. Cl.⁴ F21V *33/00*
U.S. Cl. 362—72 **8 Claims**



1. A universal headlight reflector member for mounting a headlight to a variety of headlight mountings of a variety of different mid-size motorcycles, said headlight reflector member comprising:

a circular rim having a top, a bottom, a left side, and a right side;

a left flange attached to the left side of said rim, said left flange including a rearward portion and an outward portion, said outward portion extending approximately 45 degrees outwardly from said rearward portion and including a first aperture located adjacent the left side and a second aperture spaced downwardly from said first aperture, both of said apertures being located in said outward portion and being adapted for receiving an appropriate adjustment screw for adjusting the side to side mounting of said rim in an appropriate headlight mounting;

a right flange attached to the right side of said rim, said right flange extending rearwardly and being sized to be received in a appropriate mating receiver in an appropriate headlight mounting; and

a top flange and a bottom flange attached to the respective top and bottom of said rim, said top and bottom flanges extending rearwardly and containing an aperture therein for receiving a mounting screw for attaching said rim to an appropriate headlight mounting so as to be adjustable about a vertical axis.

4,587,599

PORTHOLE ASSEMBLY FOR A SWIMMING-POOL WALL

Normand St-Hilaire, 34 rang Ste-Claire, Ste-Anne-des-Plaines, Canada (JON 1HO)

Filed Sep. 12, 1984, Ser. No. 649,716
Int. Cl.⁴ F21V *33/00*
U.S. Cl. 362—101 **10 Claims**

1. A porthole assembly for mounting in registry with an opening in a swimming-pool wall having an inner and outer face, said porthole preventing water in the swimming-pool from passing through said opening, and said porthole assembly comprising:

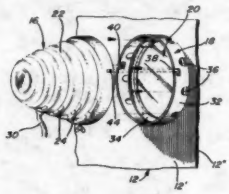
a lamp unit holding means mounted against said outer face peripherally of said opening;

a continuous transparent cover means mounted against said inner face and completely spanning said opening so that water from the swimming-pool cannot pass therethrough;

means for securing said cover means and said holding means

to said wall, the securing means having a tool-engaging end accessible from outside said swimming-pool;

means on said cover means for receiving the opposite end of said securing means in a watertight arrangement so as to



avoid contact between said securing means and water in said swimming-pool; and

a lamp unit removably mounted to said holding means, said lamp unit being separate and distinct from said transparent cover means.

4,587,600

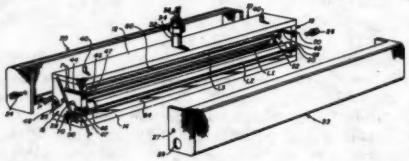
LIGHTING FIXTURE

John Morten, 11 Glen St., Dover, Mass. 02030

Filed Apr. 30, 1985, Ser. No. 728,826

Int. Cl.[4] F21V *13/00, 23/00*

U.S. Cl. 362—219 **18 Claims**



1. A lighting fixture comprising;

a support frame having top and bottom walls interconnected with end support pieces and defining an illuminating compartment therebetween,

said support frame having open sides,

at least one elongated lamp disposed in said illuminating compartment and supported between said end support pieces,

means for enabling excitation of the lamp,

translucent cover means disposed about said support frame over the open sides thereof,

and mirror means disposed in the support frame adjacent said lamp and including a top mirror on the frame top wall and a bottom mirror on the frame bottom wall,

whereby the light output from the illuminating compartment is uniformly dispersed through the translucent cover means.

4,587,601

COMBINED FLOOD AND SPOT LIGHT INCORPORATING A REFLECTOR MEMBER OF CIRCULAR AND PARABOLIC LONGITUDINAL CROSS SECTION

William J. Collins, Boulder, Colo., assignor to Collins Dynamics, Inc., Aurora, Colo.

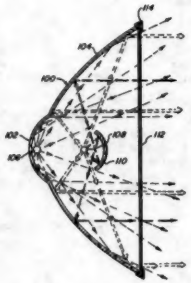
Continuation of Ser. No. 285,944, Jul. 23, 1981. This application Dec. 21, 1984, Ser. No. 684,913

Int. Cl.[4] F21V *1/00*

U.S. Cl. 362—235 **8 Claims**

1. A combined flood and spot light comprising:

a first reflector member including a central spherical portion of circular longitudinal cross section integrally connected at a periphery thereof to a peripherical parabolic portion of parabolic longitudinal cross section, an X-Y Cartesian coordinate system defining a longitudinal plane through said first reflector member, said X-Y coordinate system oriented with respect to said first reflector member so that a Y axis is coincident with a longitudinal axis of said reflector member and an X axis intersects said Y axis to define an origin of said X-Y coordinate system at the vertex of the parabola of said parabolic portion in said longitudinal plane, the positive Y axis extending away from said parabola and passing through the circle of the spherical portion in said longitudinal plane, said circle in said plane having the equation $(X-0)^2+(Y+0.700)^2=1.0609$ and said parabola of the parabolic portion having a locus substantially defined by the equation $X^2=-4.225Y$, the directrix of said parabola



being along the line $Y=1.05625$, said locus of said parabolic portion terminating at an outer periphery at an X and Y coordinate within 2 percent of the X and Y coordinate of the parabolic equation, a first lamp located at the focus of said parabola near $X=0$ and $Y=-1.05625$, said first lamp emitting light rays which are reflected primarily off of said parabolic portion and travel primarily forward in a substantially parallel array to provide a spot light, and a second lamp on said longitudinal Y axis at a physical location rearward of said first lamp, said second lamp emitting light rays having means to cause said last mentioned rays to travel primarily laterally to said spherical portion and are then reflected forwardly in a substantially random array to provide a flood light.

4,587,602

LIGHTING FIXTURE HINGE ASSEMBLY

John R. Dean, and Edward B. Bilson, both of Memphis, Tenn., assignors to FL Industries, Inc., Livingston, N.J.

Filed Apr. 12, 1985, Ser. No. 722,503

Int. Cl.[4] F21V *21/26, 21/00*

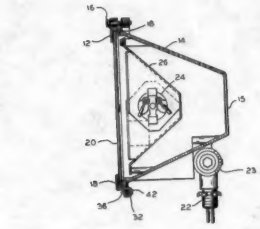
U.S. Cl. 362—375 **11 Claims**

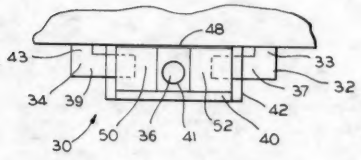
1. A hinge for use in a lighting fixture, said hinge comprising a hinge bar affixed to a lower edge of a lighting fixture housing, said hinge bar having two cylindrical bar sections axially aligned along an axis parallel to the lower edge of the housing, said bar sections being spaced apart from each other to form a gap therebetween,

said hinge also comprising a hinge hook affixed to a lower edge of a lighting fixture bezel door, said hinge hook having an elongated concave configuration, with a centerpiece separating the hinge hook into two open-ended, open-faced chambers, and a stud extending from said centerpiece,

said hinge hook adapted to fit over said hinge bar such that each of said bar sections is received in one of said hinge hook chambers whereby said bezel door is rotatable to

open from and close against said housing along the axis of said hinge,





and a fastener fitted over said stud to secure said hinge hook to said hinge bar to assure the affixation of said bezel door to said housing.

4,587,603

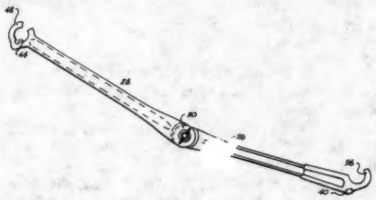
LANTERN HOLDER

Thomas M. Hughes, 310 Cardinal Dr., Taylors, S.C. 29687

Filed Feb. 7, 1985, Ser. No. 699,332

Int. Cl.[4] F21M *3/18*

U.S. Cl. 362—427 **4 Claims**



1. A lantern holder for supporting a lantern from a cleat carried on a structure such as the gunwale of a boat, said cleat having an opening defined by a pair of spaced support members which are joined by a horizontal securing member, said holder comprising:

(a) an elongated support body including,

(i) a first arm;

(ii) a second arm, and

(iii) connection means releasably securing said first arm to said second arm;

(b) attachment means integral with said support body for removable interengagement with said cleat, said attachment means being carried adjacent an end of said first arm and including:

(i) a substantially vertically extending U-shaped hook portion for insertion through said opening in said cleat between said support members, and

(c) receiver means integral with said support body carried adjacent an end of said second arm for removable receipt of a lantern, said receiver means being adapted to preclude inadvertent displacement of said lantern therefrom during normal use of said lantern holder.

4,587,604

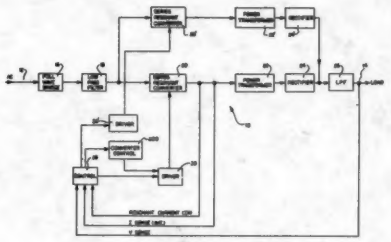
POWER SUPPLY EMPLOYING LOW POWER AND HIGH POWER SERIES RESONANT CONVERTERS

Louis R. Nerone, Cleveland, Ohio, assignor to Reliance Electric Company, Cleveland, Ohio

Filed Feb. 6, 1985, Ser. No. 698,924

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—17 **8 Claims**



1. A power supply for supplying regulated power to an output circuit from an unregulated DC voltage source, comprising:

low and high power series resonant converters interposed between a said source and an output circuit, each of said converters including a pair of power switch means adapted to be alternately turned on and off for each completing, when on, a series resonant circuit with a primary winding of a transformer coupled to said output circuit so that current pulses alternately flow in opposing directions through said primary winding as said switch means are turned on and off, said low power converter having its resonant circuit composed of lower valued power components than that of said high power converter;

switch control means for alternately supplying a switch on signal for turning on only one of said switch means in each of said converters and then a switch on signal for turning on only the other of said switch means in each of said converters at an operating frequency which varies with the loading of said output circuit; and

converter control means responsive to said operating frequency for disabling said high power converter switch means when the operating frequency of both said converters falls below a predetermined frequency whereupon only said low power converter operates to supply power to the output circuit.

4,587,605

INVERTER-DRIVE CONTROLLING APPARATUS

Kazumi Kouyama, Otsu; Takashi Deguchi; Masahiro Kadono, both of Kusatsu, and Shigeki Harada, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jan. 17, 1985, Ser. No. 692,183

Claims priority, application Japan, Jan. 19, 1984, 59-8002; Jan. 19, 1984, 59-8003; Jan. 19, 1984, 59-8004

Int. Cl.[4] H02M *1/14*

U.S. Cl. 363—41 **12 Claims**

1. An inverter-drive controlling apparatus of sinusoidal wave of unequal width PWM type, wherein PWM signal comprises a data region and a HALT region in each of carrier period which is made by equally dividing the half period of a sinusoidal wave to be simulated by a predetermined integer called a carrier,

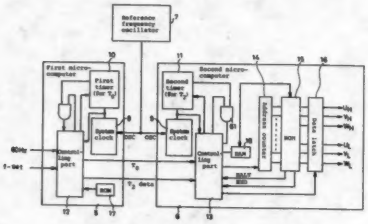
the apparatus comprising:

first timer means for digitally producing said carrier period responding to desired rotation number of a motor to drive,

second timer means for operating a routine containing plural steps for producing voltage data by using digital means which is independent from said first timer means,

voltage fluctuation detecting means for detecting fluctuation of power source voltage,

a memory storing data for one or half period of waveform generate by an inverter, storing HALT data to stop impressing of voltage to said motor during HALT regions where no said voltage data exists, and storing compensated data of said second timer compensated by output from said voltage fluctuation detecting means, and



inverter output voltage compensation means for compensating output voltage of said inverter basing on said compensation data of said second timer, wherein

initial data access in each carrier period is made by said first timer means and said second timer means and next data access in each carrier period is made by said second timer means, thereby making a compensation of output voltage of said inverter based on said voltage fluctuation.

4,587,606

HIGH VOLTAGE TRANSFORMER AND RECTIFIER ARRANGEMENT

Masashi Sanada, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Filed Oct. 10, 1984, Ser. No. 659,432

Claims priority, application Japan, Oct. 12, 1983, 58-191444

Int. Cl.⁴ H02M *7/10*

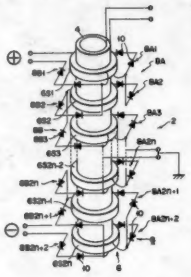
U.S. Cl. 363—68 **7 Claims**

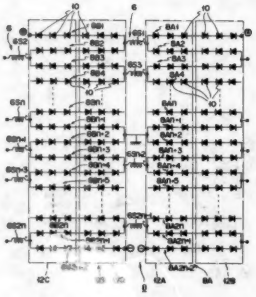
1. A high voltage transformer comprising:

a primary winding;

a secondary winding which is disposed to surround said primary winding, said secondary winding having a plurality of winding sections; and

a rectifier circuit, said rectifier circuit having four planes which surround said secondary winding and a longitudinal direction of each of which is parallel with an axial direction of said secondary winding; first and second diode groups each of which has a plurality of diode sections including at least one diode, the diodes in each of said first and second groups being connected in series so as to have the same polarity directions and being disposed in said planes; and connecting means for connecting said diode sections to said winding sections so that both diode





sections to which voltage induced in each of said winding sections is applied are not disposed on the same plane.

4,587,607

NUMERICAL CONTROL DEVICE

Mitsuo Kurakake, Hino, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

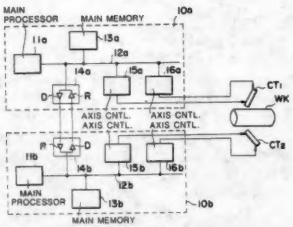
PCT No. PCT/JP81/00156, § 371 Date Mar. 5, 1982, § 102(e) Date Mar. 5, 1982, PCT Pub. No. WO82/00211, PCT Pub. Date Jan. 21, 1982

Continuation of Ser. No. 355,725, Mar. 3, 1982, abandoned. This PCT application Jul. 7, 1981, Ser. No. 705,055

Claims priority, application Japan, Jul. 7, 1980, 55-92382

Int. Cl.⁴ G06F *15/46, 15/16*

U.S. Cl. 364—167 **3 Claims**



1. A numerical control device for controlling a machine tool having first and second controllable tools, said device comprising:

master numerical control means, operatively connected to

the machine tool, for numerically controlling the first controllable tool, said master numerical control means comprising:

first processor means for generating numerical control commands;

first axis control means operatively, connected to said first processor means and the first controllable tool of the machine tool, for controlling the first controllable tool; and

first coupling means, operatively connected to said first processor means, for transmitting numerical control information; and

slave numerical control means, operatively connected to said first coupling means of said master numerical control means and the machine tool, for receiving the numerical control information and numerically controlling the second controllable tool and being controlled by said master numerical control means, said slave numerical control means comprising:

second processor means for generating numerical control commands;

second axis control means, operatively connected to said second processor means and the second controllable tool of the machine tool, for controlling the second controllable tool; and

second coupling means, operatively connected to said second processor means and said first coupling means, for transmitting the numerical control information between said slave and master numerical control means.

4,587,608

METHOD OF AUTOMATICALLY CREATING NUMERICAL CONTROL DATA IN ONE OF A PLURALITY OF DATA FORMATS

Hajimu Kishi, and Kunio Tanaka, both of Tokyo, Japan, assignors to Fanuc Ltd., Hino, Japan

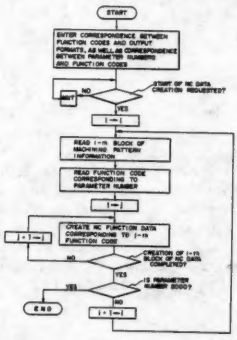
PCT No. PCT/JP83/00390, § 371 Date Jun. 27, 1984, § 102(e) Date Jun. 27, 1984, PCT Pub. No. WO84/01840, PCT Pub. Date May 10, 1984

PCT Filed Oct. 29, 1983, Ser. No. 626,879

Claims priority, application Japan, Oct. 30, 1982, 57-191238

Int. Cl.[4] G05B *19/403*

U.S. Cl. 364—191 **7 Claims**


START
ENTER CORRESPONDENCE BETWEEN FUNCTION CODES AND OUTPUT FORMATS, AS WELL AS CORRESPONDENCE BETWEEN PARAMETER NUMBERS AND FUNCTION CODES
START OF NC DATA CREATION REQUESTED?
NO
YES
i ← 1
READ i-th BLOCK OF MACHINING PATTERN INFORMATION
READ FUNCTION CODE CORRESPONDING TO PARAMETER NUMBER
i ← 1
CREATE NC FUNCTION DATA CORRESPONDING TO i-th FUNCTION CODE
i ← i + 1
CREATION OF i-TH BLOCK OF NC DATA COMPLETED?
NO
YES
IS PARAMETER NUMBER ZERO?
YES
NO
END
i ← i + 1

7. A method for automatically creating numerical control data in an apparatus including a memory for storing a correspondence between function codes and parameters specifying a desired machining pattern and for storing a correspondence between each function code and an associated numerical control output data format, and including a processor for accessing the memory and generating the numerical control data, said method comprising the steps of:

a. defining the desired machining pattern;

b. generating parameters in accordance with the desired machining pattern;

c. determining the function codes associated with each parameter;

d. determining the numerical control output data format associated with each determined function code; and

e. generating numerical control data in accordance with the determined numerical control output data format and the generated parameters.

4,587,609

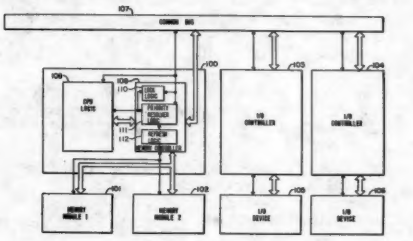
LOCKOUT OPERATION AMONG ASYNCHRONOUS ACCESSERS OF A SHARED COMPUTER SYSTEM RESOURCE

Daniel A. Boudreau, Billerica; James M. Sandini, Berlin, and Edward R. Salas, Billerica, all of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Jul. 1, 1983, Ser. No. 510,472

Int. Cl.[4] G06F *13/14, 9/46*

U.S. Cl. 364—200 **19 Claims**



17. A method for inhibiting access to a shared resource within a data processing system having a plurality of units operating asynchronously with respect to a main unit, said main unit and a one unit of said plurality of units capable of simultaneously requesting uninterrupted access to said shared resource, said method comprising the steps of:

A. allowing said main unit to unconditionally set a first indicator that said main unit desires uninhibited access to said shared resource;

B. receiving a first lock signal from said one unit indicating that said one unit desires uninterruptable access to said shared resource;

C. synchronizing said main unit's request and said one unit's request for uninterrupted access to said shared resource by storing ths status of said first indicator in a second indicator when said first lock signal is received;

D. generating a positive response to said one unit when said first lock signal is received if said second indicator does not indicate that said main unit desires uninterrupted access and if a third indicator does not indicate that said first lock signal has been received;

E. generating a negative response to said one unit when said first lock signal is received is said second indicator indicates that said main unit desires uninterrupted access to said shared resource or if said third indicator indicates that said first lock signal has been received; and

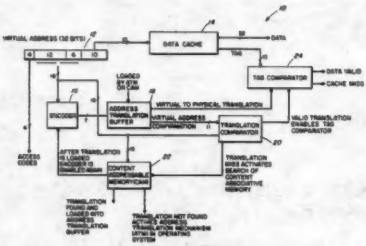
F. storing said indication that said one unit desires uninterrupted access to said shared resource in said third indicator if said positive response is generated.

4,587,610

ADDRESS TRANSLATION SYSTEMS FOR HIGH SPEED COMPUTER MEMORIES

Paul K. Rodman, Ashland, Mass., assignor to Prime Computer, Inc., Framingham, Mass.

Filed Feb. 10, 1984, Ser. No. 578,796
Int. Cl.[4] G06F *12/10*
U.S. Cl. 364—200 **17 Claims**



1. In an address translation system for use in a data processing system which employs virtual addressing for referencing a physical memory, said processing system employing a translation buffer means for storing a plurality of addresses together with a translation thereof into physical memory addresses, and means for accessing said translation buffer with an address related to a virtual address for determining if said buffer means has a translation of said virtual address therein, the improvement comprising

A. a content addressable memory for storing addresses and translations thereof into physical memory, said content addressable memory being substantially smaller than said buffer means,

B. means for searching said content addressable memory for a translation of a virtual address, and

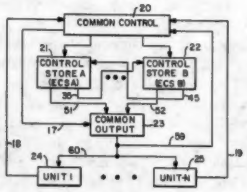
C. means for updating said content addressable memory with new addresses and translations.

4,587,611

MULTIPLE MODULE CONTROL STORE FOR USE IN A DATA PROCESSING SYSTEM

Gene M. Amdahl, Saratoga, and Hsiao-Peng S. Lee, Sunnyvale, both of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 184,126, Sep. 4, 1980, abandoned. This application Sep. 28, 1984, Ser. No. 655,949
Int. Cl.[4] G06F *9/26*
U.S. Cl. 364—200 **20 Claims**



1. Sequencing apparatus for controlling units of a data processing system comprising:

first and second control store means, each one of said control store means having locations for storing microinstruction control words for controlling said units, each one of said control store means having locations for storing branch addresses where the branch addresses are accessible with the control words, said branch addresses from said first control store means for addressing said second control store means and said branch addresses from said second control store means for addressing said first control store means, each one of said control store means having means for providing a next-in-order address, and each one of said control store means having selection means for selecting a next-in-order address or a branch address to access a control word and a branch address from the other one of said control store means,

output means in communication with said first and second control store means and said units for selecting a control word either from said first control store means or from said second control store means for controlling said units,

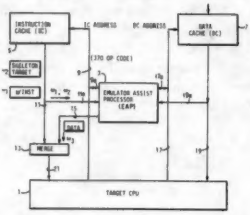
control means including means for generating a selection signal connected for controlling the sequencing of addresses selected by said selection means in both said first and said second control store means and said control means including means for accessing both said first and second control store means concurrently in the same cycle whereby each of said first and second control store means provides a branch address for the other one of said control store means in said same cycle.

4,587,612

ACCELERATED INSTRUCTION MAPPING EXTERNAL TO SOURCE AND TARGET INSTRUCTION STREAMS FOR NEAR REALTIME INJECTION INTO THE LATTER

Dale E. Fisk; Robert L. Griffith, both of San Jose; Merle E. Homan, Los Gatos, all of Calif.; George Radin, Piermont, N.Y., and Waldo J. Richards, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

PCT No. PCT/US82/01496, § 371 Date Dec. 22, 1982, § 102(e) Date Dec. 22, 1982
PCT Filed Oct. 22, 1982, Ser. No. 516,607
Int. Cl.[4] G06F *9/00*
U.S. Cl. 364—200 **8 Claims**



1. A method for converting a source CPU multifield instruction obtained from memory as data into one or more target CPU multifield instructions; comprising the steps of:

fetching a microinstruction and at least one skeleton target instruction from the memory under control of said source instruction; and

filling in the skeleton target instruction according to the microinstruction contents by copying or computing from selected fields of said source instruction into the skeleton instruction.

4,587,613

MICROPROCESSOR CONTROL SYSTEM WITH A BIT/BYTE MEMORY ARRAY

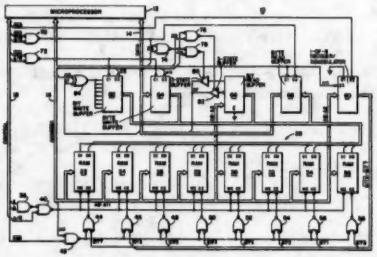
Kenneth R. Duncan, Minnetonka, Minn., assignor to Solid Controls, Inc., Minneapolis, Minn.

Filed Feb. 21, 1985, Ser. No. 704,080
Int. Cl.[4] G06F *9/22, 3/04*
U.S. Cl. 364—200 **8 Claims**

1. A microprocessor system including a microprocessor providing a plurality of control signals and a plurality of address signals, said system comprising:

an external memory array including a plurality of uniquely addressable memory means, each of said memory means having a plurality of directly addressable data storage locations;

control means being responsive to said microprocessor control signals for selecting said external memory array and for synchronizing said external memory array to the microprocessor and for controlling the transfer of data between said external memory array and the microprocessor; and



addressing means being responsive to said microprocessor address signals for selecting a predetermined one of said uniquely addressable memory means and for selecting a predetermined addressable data storage location within said addressing means, said addressing means including means for identifying a data bit mode and a data byte mode whereby the microprocessor is enabled to selectively manipulate bytes or individual bits of data.

4,587,614

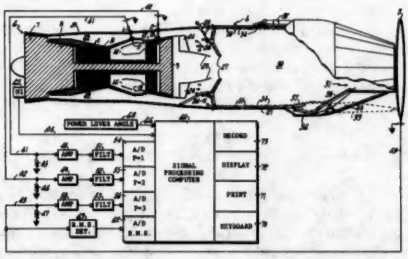
SYSTEM FAULT DETECTION IN ELECTROSTATIC FLOW DIAGNOSTICS

Robert P. Couch, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 28, 1982, Ser. No. 453,965

Int. Cl.[4] G08B *29/00*; F02C *7/32*

U.S. Cl. 364—431.02 **2 Claims**



1. Electrostatic diagnostic apparatus for distinctly recognizing different events occurring in an operating gas turbine engine, comprising:

a plurality of electrostatic signal means, each including a probe to be disposed in the gas stream of an engine, for providing, when said probe is disposed in the gas stream of an operating engine, a probe signal having amplitude variations indicative of the magnitude of electrostatic charge flowing in the gas stream in the vicinity of said probe, said probes being disposed along the gas stream of said engine spaced apart from one another, whereby electrostatic charge in the gas stream of the engine first flows past a first one of said probes and then flows past a second one of said probes within a range of time thereafter; and

signal processing means connected for response to each of said electrostatic signal means, for providing a system fault signal indicative of failure of said diagnostic apparatus in response to said first and second probes each providing a probe signal in excess of a threshold magnitude in a timed relationship other than within said range of time.

4,587,615

SYSTEM FOR DIAGNOSING AN INTERNAL COMBUSTION ENGINE

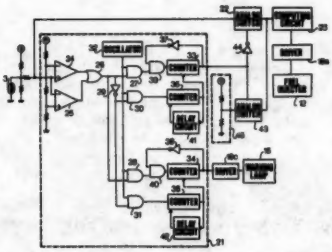
Toshio Takahashi, Mitakashi, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1983, Ser. No. 535,511

Claims priority, application Japan, Oct. 1, 1982, 57-173628

Int. Cl.[4] F02D *5/00*; G06F *11/30*

U.S. Cl. 364—431.11 **2 Claims**



1. A system for diagnosing an internal combustion engine comprising:

an engine operation sensing device;

a diagnosing circuit including a window comparator for producing a first output signal when the output of said sensing device exceeds one of predetermined limit values, and first and second circuit means operatively coupled to said window comparator,

said first circuit means producing a second output signal when the first output signal of said comparator continues for a first predetermined time,

said second circuit means producing a third output signal when the first output signal continues for a second predetermined time longer than the first predetermined time;

a fail-safe signal generating circuit producing a fail-safe signal;

switch means responsive to said second output signal of said first circuit means for allowing the fail-safe signal to pass from said fail-safe signal generating circuit;

means responsive to said fail-safe signal for producing a quasi signal to maintain the operation of the engine; and

an indicator means responsive to said third output signal for indicating trouble in said engine operation sensing device.

4,587,616

CONTROL SYSTEM FOR VENEER SLICER

George Weil, Mississauga, Canada, assignor to David R. Webb Co., Inc., Edinburgh, Ind.

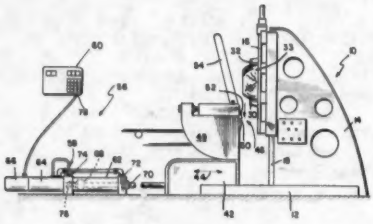
Filed May 31, 1983, Ser. No. 499,503

Int. Cl.[4] G06F *15/46*

U.S. Cl. 364—475 **11 Claims**

1. In a reciprocating veneer slicer comprising a flitch table providing a mounting surface, means for securing a flitch to the mounting surface, a knife and pressure bar assembly movable along a path toward and away from the mounting surface, the flitch table being reciprocable between first and second opposite positions transversely relative to the path of the knife and pressure bar assembly in a cutting and return stroke, the improvement comprising a linear hydraulic actuator for advancing the knife and pressure bar assembly toward the mount-

ing surface prior to the cutting stroke to provide a uniform depth of cut and for retracting the knife and pressure bar assembly away from the mounting surface after the cutting stroke and prior to the return stroke, the linear hydraulic actuator advancing and retracting the knife and pressure bar



assembly in indexes, an index comprising one or more steps of uniform incremental distance, advance indexes after an initial index consisting of an equal number of steps, retract indexes prior to a final retract index consisting of an equal number of steps, the depth of cut determined by the difference the number of steps in the advance and retract indexes.

4,587,617

IMAGE INSPECTION SYSTEM FOR DEFECT DETECTION

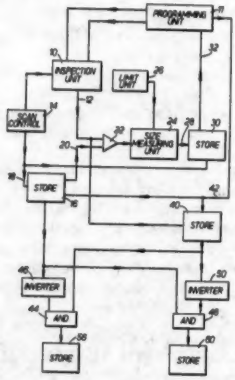
John C. Barker, Oakington, and Ian A. Cruttwell, Great Chishall, Nr. Royston, both of England, assignors to Cambridge Instruments Limited, Cambridge, England

Filed Oct. 18, 1983, Ser. No. 543,038

Claims priority, application United Kingdom, Nov. 2, 1982, 8231268

Int. Cl.[4] G06F *15/70*; G06K *9/46*

U.S. Cl. 364—507 **13 Claims**



3. An image inspection system, comprising

comparison means responsive to the said image and to a desired form thereof and operative to carry out a rapid inspection of the whole image so as to detect the existence of any abnormalities therein and at least the approximate position of those abnormalities by comparing the actual image with the desired form thereof,

storage means responsive to the comparison means and connected to store signals corresponding to the detected abnormalities and at least their said approximate positions, and

inspection means responsive to the stored signals and operative less rapidly to inspect the said detected abnormalities and to classify those abnormalities as to type and to measure their sizes,

the said inspection means comprising means operative to classify each abnormality as either being an abnormality of addition or an abnormality of omission, and means operative to classify the abnormalities of addition and the abnormalities of omission as being particular types of such abnormalities.

4,587,618

APPARATUS FOR CONTROLLING OPERATION OF AN INDUSTRIAL ROBOT

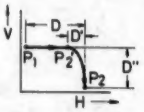
Yukio Oguchi, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Filed Apr. 8, 1983, Ser. No. 483,303

Claims priority, application Japan, Apr. 12, 1982, 57-60669

Int. Cl.[4] B25J *13/00*; G05B *19/42*; B65G *47/90*

U.S. Cl. 364—513 **8 Claims**



1. Apparatus for controlling the operation of a point-to-point programmed controlled device having an arm movable to a predetermined position under a plurality of programmed steps, comprising:

detection means for detecting the position of said arm and producing an output signal as said arm moves under control of a first program step;

memory means for storing an intermediate position signal corresponding to an intermediate position during movement of said arm to said predetermined position;

first position deriving means responsive to said output signal for deriving a first position signal indicative of the position of said arm; and

comparator means for receiving and comparing said first position signal and said intermediate position signal and producing a position completion signal when said arm reaches said intermediate position; said position completion signal being utilized to commence execution of a second program step while said arm is moving from said intermediate position to said predetermined position.

4,587,619

METHOD AND APPARATUS FOR ELECTRONIC LEAK TESTING

Vernon G. Converse, III, Franklin; James M. Bordato, Grosse Pointe Wds.; Theodore R. Bott, Berkley; Charles E. Foerster, Jr., Northville, all of Mich.; Desra N. Herbst, Jr., Spring Valley, Ohio; Ronald K. Mudge, Brighton, Mich.; Richard L. Smith, Livonia, Mich., and Frank R. Young, Franklin, Mich., assignors to Scans Associates, Inc., Livonia, Mich.

Filed Dec. 14, 1981, Ser. No. 330,384

Int. Cl.[4] G01M *3/02*; G06F *15/20*

U.S. Cl. 364—552 **73 Claims**

70. A method of leak testing a part using a selected test medium from a selected source comprising the steps of:

(a) subjecting the part to a predetermined test medium pressure;

(b) isolating the part from the source of selected test medium while continuing to subject the part to pressure;

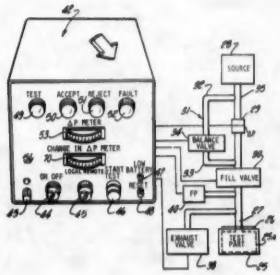
(c) sensing a first differential pressure between a pressure at the source of the test medium and a pressure at the part being tested;

(d) waiting a selected time interval;

(e) sensing a second differential pressure between the pressure

at the source of the test medium and the pressure at the part being tested;

(f) determining the magnitude of any change between the first and second sensed pressure differentials;



(g) comparing the magnitude of the change between the first and second sensed differential pressures to a predetermined value; and

(h) accepting or rejecting the part based on the results of comparing the magnitude of the change between the first and second differential pressures to the predetermined value.

4,587,620
NOISE ELIMINATION DEVICE

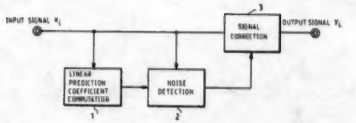
Koji Niimi, and Takayasu Kondo, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Apr. 30, 1982, Ser. No. 373,437

Claims priority, application Japan, May 9, 1981, 56-69814; May 9, 1981, 56-69815; May 9, 1981, 56-69816; May 9, 1981, 56-69817; May 9, 1981, 56-69818; May 9, 1981, 56-69819

Int. Cl.⁴ H04B *15/00, 1/34*

U.S. Cl. 364—574 **13 Claims**



1. A noise elimination device comprising:

linear predicted value computation means for receiving a digitized continuous input signal and for computing a linear predicted value of the input signal wherein said linear predicted value computation means comprises means for computing autocorrelation function of said input signal, means for computing linear prediction coefficients from said computed autocorrelation function and means for calculating the linear predicted value as a function of said linear prediction coefficients;

prediction error detection means for computing a prediction error corresponding to the difference between the linear predicted value and said input signal;

threshold value setting means for setting a noise detection threshold value for said input signal on the basis of at least one of instantaneous values of said input signal and the computed prediction error corresponding to said instantaneous values;

comparison means, coupled to an output of the prediction error detection means and to an output of the threshold value setting means, for judging whether said prediction error has exceeded said threshold value or not and, if it has, regarding the instantaneous value at that time as noise;

substitution signal producing means for producing a substitution signal on the basis of an instantaneous value in the vicinity of the instantaneous value having been regarded as noise by said comparison means; and

switching means for outputting said input signal when noise has not been detected as a result of comparison by said comparison means and said substitution signal when noise has been detected.

4,587,621
DEVICE FOR ELECTRICAL VARIABLE MAGNIFICATION OF DOCUMENT IMAGE

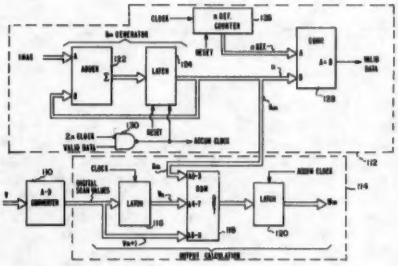
Dale R. DuVall, Keller, Tex., assignor to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 355,807, Mar. 8, 1982, Pat. No. 4,532,602. This application Jun. 3, 1983, Ser. No. 500,758

The portion of the term of this patent subsequent to Jul. 30, 2002, has been disclaimed.

Int. Cl.⁴ G06G *7/30;* G03B *27/52*

U.S. Cl. 364—577 **3 Claims**



1. A system for altering the size of an image by a desired magnification after optical scanning thereof in dependence upon a selected magnification value by providing a plurality of output scan values different in number from the number of sampled scan signals produced during optical scanning, said output scan values being representative of the density of the image at pixel locations arranged in rows and columns across the image, said system comprising:

scanning means for providing a series of sequences of sampled scan signals, each such sequence of sampled scan signals being representative of the image densities at associated pixel locations in a row of pixel locations across said image, successive sequences of sampled scan signals corresponding to successive rows of pixel locations with signals correspondingly positioned in said sequences relating to pixel locations in the same column,

converter means for converting said series of sequences of sampled scan signals to a corresponding series of sequences of digital scan values,

control circuit means, responsive to said magnification value, for providing a plurality of interpolation control values in synchronism with said successive sequences of digital scan values, said interpolation control values indicating the spatial relationship of output scan values with respect to pairs of sequences of digital scan values, and

interpolation means responsive to said pairs of sequences of digital scan values and to said interpolation control values, for interpolating between pairs of sequences of said digital scan values to provide said output scan values;

said control circuit means comprising integrator means responsive to said magnification value for integrating said magnification value and providing a first portion of the integral thereof as said interpolation control values.

4,587,622

METHOD AND APPARATUS FOR DETERMINING AND CORRECTING GUIDANCE ERRORS

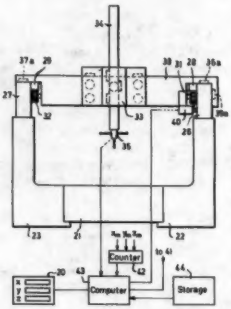
Klaus Herzog, Oberkochen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany

Filed Dec. 1, 1982, Ser. No. 446,163

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1981, 3150977

Int. Cl.[4] G05B 19/18; G01B 11/26

U.S. Cl. 364—561 15 Claims



1. In a measuring machine (i) wherein a rectilinear guide establishes a path of longitudinal guidance in the course of displacement of a movable part with respect to a fixed part of a given plane, (ii) wherein said parts longitudinally overlap for a predetermined fraction of the maximum extent of longitudinal guidance, and (iii) wherein means including an incremental scale and a scale-reading device measure displacement along said path, a longitudinally extending scale and two scale-reading transducers for determining deviations from a desired straight path of displacement, said scale being a fixed feature of said fixed part and comprising a plurality of uniformly and closely spaced parallel longitudinally extending lines which are strictly parallel to each other and which establish a basis of parallel reference to the desired straight-line path over the longitudinal extent of said path, the lines of said scale being parallel to said given plane and extending the length of said path, said transducers being carried at predetermined longitudinal spacing near the repective longitudinal ends of said movable part and effectively spanning the extent of said overlap, each of said transducers producing a change in transverse measurement in response to any traversing incremental scan displacement with respect to one or more of the lines of said scale; whereby, in the course of guided displacement of said movable part, the instantaneous difference between the repective transverse measurements generated by the respective transducers is a measure of instantaneous yaw-angle deviation of said parts with respect to each other, and whereby the instantaneous average of said respective transverse measurements is a measure of instantaneous transverse offset of said movable part from said desired straight-line path.

4,587,623

METHOD FOR RECALIBRATING NUCLEAR DENSITY GAUGES

Ali Regimand, Raleigh, and John L. Molbert, Durham, both of N.C., assignors to Troxler Electronic Laboratories, Inc., Research Triangle Park, N.C.

Filed Apr. 26, 1983, Ser. No. 488,739

Int. Cl.[4] G06F 15/52

U.S. Cl. 364—571 18 Claims

1. A method for recalibration of a nuclear density gauge for one source depth position thereof to account for changes in gauge geometry and other factors affecting gauge calibration accuracy and wherein the gauge has been previously calibrated for the source depth position by calibration tests taken on at least three calibration blocks, with the calibration data derived therefrom fitted to a working exponential equation

$$CR = A \exp(-BD) - C,$$

where:

CR = count ratio derived by comparing an accumulated count from a test specimen to a standard count,

D = density of test specimen as calculated by the gauge,

A,C = constants obtained from original calibration, primarily dependent on gauge geometry, and

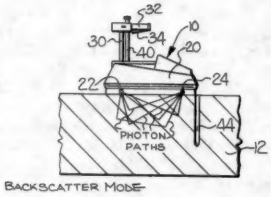
B = constant obtained from original calibration, primarily dependent on mass attenuation coefficient,

and with the original calibration constants A, B, and C for the gauge being recorded and used in the calculation of density D measured by the gauge,

said method comprising the steps of:

(a) obtaining the recorded original calibration constant B for the gauge,

(b) positioning the gauge with the source at said source depth position with respect to a first calibration block of known density and obtaining an accumulated count of scattered radiation therefrom, comparing the accumulated count to a standard count to obtain a count ratio, and establishing therefrom the following relations,



(i) $CR_1' = A' \exp(-B'D_1') - C'$,

where:

CR_1' = the count ratio from step (b), and

D_1' = the known density of the first calibration block;

A',B',C' = constants obtained from recalibration method;

(c) positioning the gauge with the source at said depth position with respect to a second calibration block of known density different from that of said first block and obtaining an accumulated count of scattered radiation therefrom, comparing the accumulated count to a standard count to obtain a count ratio, and establishing therefrom the following relationship,

(ii) $CR_2' = A' \exp(-B'D_2') - C'$,

where:

CR_2' = the count ratio from step (c), and

D_2' = the known density of the second calibration block;

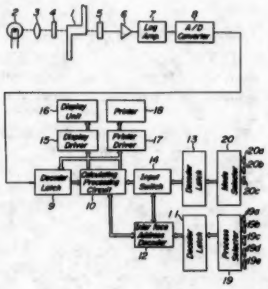
(d) calculating values for the unknowns, A' and C' from the equations (i) and (ii) by employing as the calibration constant B', the original calibration constant B, and

(e) storing the thus derived values for A' and C' for subsequent use in determining density the D in the operation of the gauge.

4,587,624
METHOD AND APPARATUS FOR CORRECTING A CURVE RELATING AN ABSORBANCE TO A CONCENTRATION

Taiichi Banno, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Dec. 20, 1982, Ser. No. 451,419
Claims priority, application Japan, Dec. 24, 1981, 56-208047
Int. Cl.[4] G01N *21/00*
U.S. Cl. 364—571 7 Claims



1. A method of determining the concentration of an unknown sample having a non-linear curve relating absorbance to concentration of the unknown sample comprising the steps of:

forming said non-linear curve by using at least three standard samples having known different concentrations;

measuring an absorbance value of only one standard sample of said at least three standard samples having known different concentrations;

correcting the non-linear curve on the basis of said measured absorbance value;

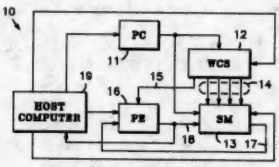
measuring the absorbance value of said unknown sample; and

deriving a concentration for said unknown sample from said corrected non-linear curve using the measured absorbance value of said unknown sample.

4,587,625
PROCESSOR FOR SIMULATING DIGITAL STRUCTURES

Joseph T. Marino, Jr., Chandler, and Ronald V. Chandos, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Jul. 5, 1983, Ser. No. 510,717
Int. Cl.[4] G06F *15/16, 15/60*
U.S. Cl. 364—578 25 Claims



10. A system for simulating digital structures comprising:

host computer means for creating a description of a digital structure in terms of an advanced primitive and for creating input vectors;

first memory means for storing said description;

second memory means for storing present and previous state data, said second memory means being coupled to said first memory means to receive at least one input state read address therefrom corresponding to a current primitive, said second memory means storing said input vectors;

primitive evaluator means coupled to said second memory means to receive at least one input state therefrom and to said first memory means to receive a primitive type indicator therefrom, said primitive evaluator means producing a plurality of evaluator outputs;

resolver logic means coupled to said primitive evaluator means to receive said evaluator outputs therefrom for producing an output state of said current primitive, said resolver logic means being coupled to said second memory means to provide said output state thereto; and

program counter means coupled to said first and second memory means to provide a primitive number to said first memory means and an output state write address to said second memory means, said program counter being under the control of said host computer means.

21. A method of simulating a digital structure comprising the steps of:

loading a first memory with a description of said digital structure in terms of a list of primitives and interconnections therebetween;

loading a second memory with indicators of the present and previous logic states of each of the inputs of each of said primitives; and

sequentially stepping through said list of primitives and, for each step in said sequence:

supplying a primitive evaluator with a primitive type indicator for a current primitive from said first memory;

supplying said primitive evaluator with the present and previous logic states of each of the inputs of said current primitive from said second memory;

operating said primitive evaluator to determine a next output logic state of said current primitive: and

loading said next output logic state of said current primitive into said second memory.

4,587,626
SUM AND DIFFERENCE CONJUGATE DISCRETE FOURIER TRANSFORM

Joseph H. Gray, Berkeley, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 310,469, Oct. 13, 1981, abandoned. This application Feb. 14, 1985, Ser. No. 701,830
Int. Cl.[4] G06F *15/332*
U.S. Cl. 364—726 4 Claims

1. A sum and difference conjugate N_i-length discrete Fourier transform processor for receiving a set of N_i input data values x(0), x(1), x(2), . . . x(N_i−1) and producing a set of N_i transformed data values X(0), X(1), X(2), . . . X(N_i−1), comprising:

(a) an adder circuit for adding and subtracting pairs of the N_i input data values x(n) to produce M sum values SUM(n)=x(n)+x(N_i−n) and M difference values DIFF(n)=x(n)−x(N_i−n) for n=1, 2, . . . M, where M=(N_i−1)/2;

(b) a first multiplier/accumulator circuit for producing M output values $ACC_1(k)$, k=1, 2, . . . M, by multiplying each SUM(n) value by a cosine value which is a function of k and accumulating the resulting products as follows:

$$ACC_1(k) = \sum_{n=1}^{M} \text{SUM}(n)\cos(2\pi nk/N_i), \text{ for } k = 1, 2, \ldots M;$$

(c) a second multiplier/accumulator circuit for producing M output values $ACC_2(k)$, for $k=1, 2, \ldots M$, by (1) multiplying each DIFF(n) value by a value which is a sine function of n and k, and (2) accumulating the resulting products as follows:

$$ACC_2(k) = \sum_{n=1}^{M} \text{DIFF}(n)\sin(2\pi nk/N_i), \text{ for } k = 1, 2, \ldots M;$$

(d) an accumulator circuit for producing a value ACC_3 equal to the sum of the M sum values SUM(n), $n=1, 2, \ldots M$; and

(e) a circuit for producing the N_i transformed data values $X(k)$, for $k=0, 1, 2, \ldots N_i-1$, by combining the output values of the first and second multiplier/accumulators $ACC_1(k)$ and $ACC_2(k)$ and the output value of the accumulator ACC_3 as follows, wherein $M=(N_i-1)/2$:

$$X(k=0)=x(n=0)+ACC_3;$$

$$X(k)=x(n=0)+ACC_1(k)+j\,ACC_2(k), \text{ for } k=1, 2, \ldots M;$$

$$X(N_i-k)=x(n=0)+ACC_1(k)-j\,ACC_2(k), \text{ for } k=1, 2, \ldots M.$$

4,587,627

COMPUTATIONAL METHOD AND APPARATUS FOR FINITE FIELD ARITHMETIC

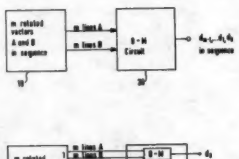
Jimmy K. Omura, Culver City, Calif., and James L. Massey, Zurich, Switzerland, assignors to OMNET Associates, Sunnyvale, Calif.

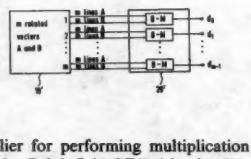
Filed Sep. 14, 1982, Ser. No. 418,039

Claims priority, application European Pat. Off., Nov. 30, 1981, 81110018.9

Int. Cl.[4] G06F 7/52

U.S. Cl. 364—754 **24 Claims**





1. A multiplier for performing multiplication of two elements in the finite Galois field $GF(2^m)$ having 2^m elements, and obtaining a product vector of m binary components, where m is an integer equal to or greater than 2, each of said 2^m elements of $GF(2^m)$ represented by a vector of m binary components, comprising:

(a) means for developing, for each of the two vectors, m successive rotated vectors, each of said vectors being represented according to a normal basis representation of the form $B=b_{m-1}A^{2m-1}+b_{m-2}A^{2m-2}+\ldots b_2A^4+b_1A^2+b_0A$, where B is an element of $GF(2^m)$ and b_{m-1}, $b_{m-2}, \ldots b_2, b_1, b_0$ are the binary components of B, and A is an element of $GF(2^m)$, where A satisfies the equation $P(X)=0$ for $X=A$ and P(X) is a polynomial of degree m which is irreducible over the field GF(2) and has linearly independent roots; and

(b) logic means for implementating a predetermined logical function having the m rotated vectors for both elements as inputs, said logic means computing each binary component of the vector representing the product of said two elements from respective pairs of said vectors using said predetermined logical function.

4,587,628

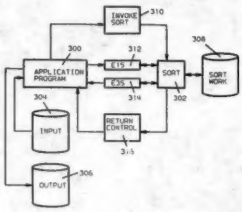
METHOD AND APPARATUS FOR DYNAMIC INVOCATION OF UTILITIES

Gary D. Archer, and Herm J. Greenberg, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 5, 1983, Ser. No. 558,268

Int. Cl.[4] G06F 7/22

U.S. Cl. 364—900 **13 Claims**



1. A method for operating a computing apparatus under control of a sort program for sorting a plurality of records in an input file into an output file in response to a request from an application program, comprising the steps of:

receiving control from said application program;

obtaining from said request the data set names of said input file and said output file;

reading from said input file a plurality of records to be sorted;

sorting said records;

writing the sorted records to said output file; and then

returning control to said application program.

4,587,629

RANDOM ADDRESS MEMORY WITH FAST CLEAR

Frederick H. Dill, South Salem; Satish Gupta, Croton-on-Hudson, both of N.Y., and Peter J. Warter, Newark, Del., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1983, Ser. No. 567,301

Int. Cl.[4] G06F 12/00

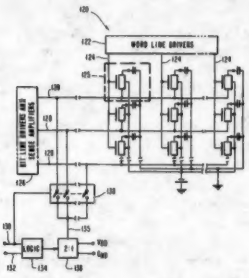
U.S. Cl. 364—900 **9 Claims**

1. In an integrated circuit random access memory array having a plurality of words of storage capacity, each of said words being arranged in a column of bits connected to a word line, the bits of said words forming rows and having all the bits in each row connected to a bit line, means for addressing each word line and each bit line for writing in a selected bit to establish the state of the selected bit line, and a sense amplifier for each bit line for sensing the selected bit, the improvement comprising:

means for coupling a signal onto said bit lines; and

fast reset control means connected to said coupling means for connecting said signal to said bit lines, and upon ener-

gizing of a selected word line, all the bits connected to said selected word line are reset to the state of said signal,



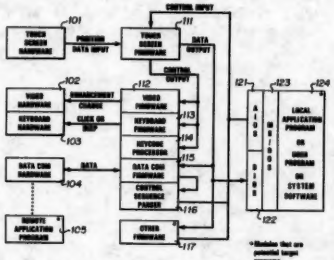
whereby reset time of said random access memory is reduced.

4,587,630

INTELLIGENT PROGRAMMABLE TOUCHSCREEN SYSTEM

Peter R. Straton, Rocklin, and Scott R. McClelland, Loomis, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 15, 1984, Ser. No. 580,408
Int. Cl.[4] G06F 3/14
U.S. Cl. 364—900 **30 Claims**



1. In a computing system, an apparatus comprising:
first detecting means for detecting an initial touch on a display surface;
second detecting means for detecting a change of touch position on said display surface; and
internal coordinating means coupled to said first and second detecting means for determining what operation should be performed for each touch position detected by said first and second detecting means.

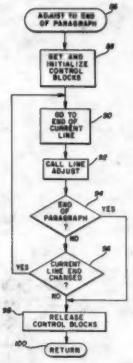
4,587,631

AUTOMATIC TEXT ADJUSTMENT

Robert C. Nielsen, Longmont, Colo.; John A. Aiken, Jr., Round Rock, and Aubrey M. Herzik, Austin, both of Tex., assignors to International Business Machines Corp., Armonk, N.Y.

Continuation of Ser. No. 569,368, Apr. 9, 1984, abandoned, which is a continuation of Ser. No. 274,363, Jun. 16, 1981, abandoned. This application Jul. 1, 1985, Ser. No. 750,978
Int. Cl.[4] G06F 3/14
U.S. Cl. 364—900 **12 Claims**

1. A method for automatically adjusting a paragraph of text in a word processing system on a line-by-line basis during editing, the text formed in a data stream, comprising the steps of:
(a) depressing an establish insert mode key during editing to establish an insert mode and set an indicator to indicate a change active condition when a change is made to a current line of text being edited and an active change has not already occurred on the current line
(b) determining positively or negatively whether an operation associated with a specified terminate insert mode key is valid when said specified terminate insert mode key is depressed to terminate said insert mode and simultaneously cause a cursor to move off the current line;
(c) if the specified terminate insert mode key has been depressed to thereby cause the cursor to move off the current line and the operation is valid, interrogating said indicator to determine if a change active condition has been indicated in step (a);



(d) adjusting a position of a lind end code in the data stream for the current line of text to provide an adjusted line, when a change active condition is detected in step (c);
(e) interrogating said adjusted line of step (d) to determine positively or negatively whether said adjusted line includes a paragraph boundary or page end code in the data stream;
(f) interrogating said adjusted line of step (d) to determine positively or negatively whether said adjusted line requires a change in position of its line end code in the data stream, when the result of the interrogation in step (e) is negative;
(g) adjusting a position of a line end code in the data stream for a line following said adjusted line, when the result of the interrogation in step (f) is positive; and
(h) repeating steps (e)–(g) until either the result of the interrogation in step (e) is positive or the result of the interrogation in both steps (e) and (f) is negative.

4,587,632

LOOKAHEAD STACK ORIENTED COMPUTER

David R. Ditzel, Watchung, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

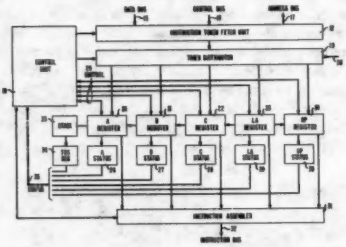
Filed May 27, 1980, Ser. No. 153,277
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—900 **9 Claims**

1. A stack oriented microprocessor computer system comprising
a main memory (10) for storing programs comprising a plurality of reverse polish (i.e., postfix) stack oriented instruction tokens,
a stack memory (33), and an instruction execution unit (14) characterized by
an operand stack storage mechanism (20,21,22) for storing

tokens received from said main memory and referring to operands,

an operator storage mechanism (24) for storing tokens received from said main memory and referring to operators,

at least one lookahead storage mechanism (23) for storing either an instruction token referring to an operator received from said main memory or an instruction token



referring to an operand following an instruction token referring to an operator received from said main memory, and

means (18 and 31) responsive to said storage mechanisms for optimizing storage accesses by dynamically combining a plurality of said operand tokens and said operator tokens for simultaneous execution by said instruction execution unit.

4,587,633

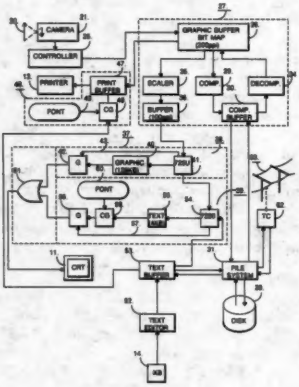
MANAGEMENT COMMUNICATION TERMINAL SYSTEM

An Wang, Lincoln, Mass.; Stanley B. Fry, Wilton, N.H.; Shu K. Ho, Carlisle, and John M. Smutek, Billerica, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Nov. 10, 1982, Ser. No. 440,668

Int. Cl.[4] G06F *3/14*

U.S. Cl. 364—900 **17 Claims**



1. A data processing terminal comprising

a camera including graphic data generator means for scanning a target for generating graphic data representative of the binary bit pattern associated with a raster image of the target, and an input device including text data generator means for generating coded text data representative of information symbols,

mass storage means for storing said text and graphic data, and monitor means and raster image printer means for displaying and printing, respectively, images in response to said graphic and text data,

graphic data buffer means electrically coupled to the graphic data generator means the printer means, the monitor means and the mass storage means for storing, short term, graphic data received from the graphic means generator data and from the mass storage means and for supplying graphic data to the printer means and monitor means, data to the printer means and monitor means,

text data buffer means electrically coupled to the text data generator means, the printer means, the monitor means and the mass storage means for storing, short term, text data received from the text data generator means and mass storage means and for supplying text data to the printer means and monitor means, and

a central processing unit (CPU) programmed to respond to commands from the input device to process text data and to control data flow to and from the graphic data buffer means, the text data buffer means and the mass storage means while maintaining an association between separately stored blocks of graphic data and text data to be displayed or printed as a composite image, the CPU being programmed to control the application of text data from the text data buffer means and associated graphic data from the graphic data buffer means to the monitor means and the printer means for respectively displaying and printing images created from a combination of the text data and the associated graphic data.

4,587,634

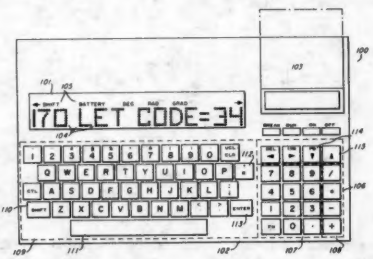
DATA PROCESSING APPARATUS FOR MULTIPLE MODE OPERATION AS SPECIFIED BY USER INPUTS

Tom M. Ferrio, and Floyd R. Gerwig, both of Lubbock, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 20, 1982, Ser. No. 450,835

Int. Cl.[4] G06F *15/02*

U.S. Cl. 364—900 **8 Claims**



1. A multimode data processing apparatus adapted for receiving program statements in any of said modes and for branching to a particular mode based upon the composition of said statements, comprising:

input means independent of a desired said mode for entering a program statement with a plurality of input characters including a plurality of alphanumeric characters which specify program lines in a higher order language and an alphanumeric character for specifying the end of the entry of input characters;

an input buffer coupled to said input means for temporarily storing input commands and statements from said input means;

an arithmetic logic unit operable in any of a plurality of data processing modes, including a program entry/edit mode responsive to said program statement for enabling selective entry and editing of program, said arithmetic logic unit coupled to said input buffer for executing data processing functions specified by said program statement

stored in said input buffer in a selected data processing mode;

an input mode interpreter, coupled to said input buffer and said arithmetic logic unit and activated after entry of said program statement alphanumeric character specifying the end of entry, for selecting one of said plurality of data processing modes in dependence upon the program statement characters stored in said input buffer;

a read/write memory for temporarily storing data therein;

said input mode interpreter selectively operable to select said program entry/edit mode for allowing a user to store program lines in said higher order language in said read/write memory and to edit said program lines if said input mode interpreter determines that the input characters stored in said input buffer comprise a program line by ascertaining that the input characters comprises an initial numeric integer followed by at least one space and an alphabetic character; and

said arithmetic logic unit operable to store the input characters stored in said input buffer in said read/write memory in a location determined by said initial numeric integer when said program entry/edit mode is selected.

4,587,635

INFORMATION RETRIEVAL SYSTEM EQUIPPED WITH VIDEO DISK

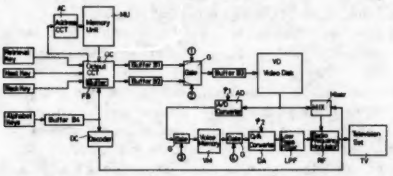
Shintaro Hashimoto, Ikoma, and Mitsuhiro Saiji, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 26, 1982, Ser. No. 382,297

Claims priority, application Japan, May 29, 1981, 56-82742; Jul. 1, 1981, 56-103828

Int. Cl.[4] G06F *9/00*

U.S. Cl. 364—900 **8 Claims**



1. An information retrieval system for use as an electronic dictionary comprising:

information disk means for recording information related to words to be defined or translated, said disk means having a plurality of concentric information tracks, said information including picture information and audio information related to each said word, said picture information and audio information being stored on separate information tracks of said disk means;

input means for entering an entry word to be defined or translated;

memory means for storing each said word to be defined or translated having related information stored on said video disk means as well as track numbers of the information tracks of said disk means having said picture information and audio information stored therein;

means, responsive to said entered word, for searching said memory means to locate and recall said track numbers on said disk means where said picture and audio information related to said entry word can be located;

first buffer means, responsive to said means for searching, for temporarily storing the track number where said picture information is located;

second buffer means, responsive to said means for searching, for temporarily storing the track number where said audio information is located;

third buffer means, operatively connected to said means for reading, for temporarily storing a said track number to be read from said video disk means;

means, responsive to entry of a said track number stored in said third buffer means, for reading the selected said track of said video disk means to read out the information recorded therein;

voice memory means, operatively connected to said means for reading, for temporarily storing audio information read from said video disk means in response to selection of a said track having audio information thereon;

means, responsive to said audio information stored in said voice memory means, for developing audible voice information related to said entry word;

gate means, operatively interconnected between said third buffer means and said first and second buffer means, for selectively transferring the contents of said first buffer means or said second buffer means to said third buffer means;

means for controlling the operation of said gate means to first transfer the contents of said second buffer means to said third buffer means to facilitate temporary storage of said audio information related to said entry word in said voice memory means and subsequently transfer the contents of said first buffer means to said third buffer means to read out picture information therefrom,

means, responsive to said means for reading, for displaying said picture information;

said control means further enabling said means for developing audible voice information simultaneously to display of said picture information by said means for displaying.

4,587,636

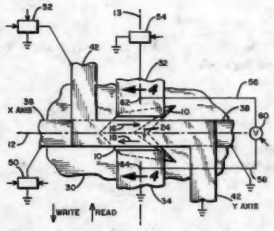
Y-DOMAIN MAGNETIC MEMORY SYSTEM

Gregory J. Cosimini, St. Paul; David S. Lo, and Lawrence G. Zierhut, both of Burnsville, all of Minn., assignors to Sperry Corporation, New York, N.Y.

Filed Feb. 8, 1985, Ser. No. 699,705

Int. Cl.[4] G11C *11/14*

U.S. Cl. 365—87 **10 Claims**



1. A Y-domain magnetic memory system, comprising:

a discrete planar magnetic memory element having a planar contour that is substantially symmetrical about a longitudinal axis;

means coupling a first writing magnetic field to said memory element for forming a Néel wall along said longitudinal axis and for forming first and second domains on opposite sides of said Néel wall; and,

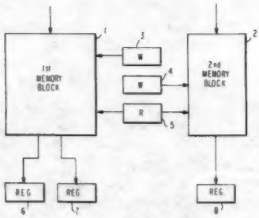
means coupling a second writing magnetic field to said memory element for forming a third domain in said memory element, which third domain is separated from said first and second domains by second and third Néel walls having a join with one end of said first Néel wall, said first, second and third Néel walls forming a Y.

4,587,637

MEMORY SYSTEM

Hisao Ishizuka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 28, 1983, Ser. No. 555,739
Claims priority, application Japan, Nov. 26, 1982, 57-206992
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—189 11 Claims



6. A speech recognition system adapted to the dynamic pattern matching method in which a feature vector, a_i, at point i, extracted from input speech information is compared against stored reference pattern, b_j, at point j, for determining the feature vector which most closely corresponds to the reference pattern, said speech recognition system comprising:

means for receiving feature vector data corresponding to input speech information;

memory means for storing reference pattern data;

a first memory array for receiving a plurlaity of said feature vectors;

a second memory array for receiving at least one reference pattern;

first write address means for write addressing said first memory array;

second write address means for write addressing said second memory array;

read address means for simultaneously read addressing said first and second memory arrays at a first address location in each memory array, said read address means including address incrementing means for read addressing a second address location in said first memory array, simultaneous with the read addressing of said first address location;

first and second data register means associated with said first memory array;

third data register means associated with said second memory array;

means for transferring the feature vector data stored at said first address location in said first memory array to said first register means;

means for transferring the feature vector data stored at said second address location in said second memory array to said second register means;

means for transferring the reference pattern stored at said first address location in said second memory array to said third register means; and

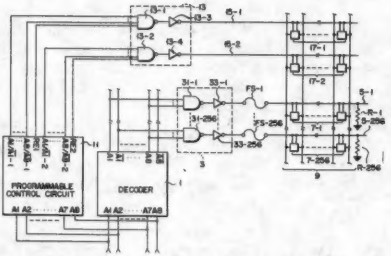
means for simultaneously comparing the reference pattern stored in said third register means with the feature vector data stored in said first register means and the feature vector data stored in said second register means.

4,587,638

SEMICONDUCTOR MEMORY DEVICE

Mitsuo Isobe, Yokohama; Takayasu Sakurai, Tokyo; Kazuhiro Sawada, Yokohama; Tetsuya Iizuka, Funabashi; Takayuki Ohtani, and Akira Aono, both of Tokyo, all of Japan, assignors to Micro-Computer Engineering Corporation, Japan

Filed Jul. 12, 1984, Ser. No. 630,115
Claims priority, application Japan, Jul. 13, 1983, 58-126233; Jul. 15, 1983, 58-127770
Int. Cl.[4] G11C *7/02*
U.S. Cl. 365—200 13 Claims



1. A semiconductor memory device comprising:

memory cells, arranged in rows, for storing data;

a plurality of select lines, each of which is connected to the memory cells in a different one of said rows;

first selecting means for receiving an address signal and for setting a predetermined voltage on one of said plurality of select lines corresponding to the contents of said address signal, thereby to place said one select line at a select level;

redundant memory cells arranged in rows;

at least one redundancy select line which is commonly connected to said redundant memory cells arranged in the same row;

programmable redundancy selecting means for receiving said address signal and for placing said redundancy select line at a select level designated by said address signal;

cuttable fuse elements individually connected between said first selecting means and a different one of said select lines; and

load means connected between said select lines and a predetermined voltage for maintaining the voltage on a select line at a non-select level different from said select level if said corresponding select line fuse element is cut.

4,587,639

STATIC SEMICONDUCTOR MEMORY DEVICE INCORPORATING REDUNDANCY MEMORY CELLS

Keizo Aoyama, Yamato; Teruo Seki, and Takahiko Yamauchi, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Mar. 27, 1984, Ser. No. 593,771
Claims priority, application Japan, Mar. 28, 1983, 58-50347; Mar. 29, 1983, 58-51535
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—200 13 Claims

1. A static semiconductor memory device comprising:

a power supply means;

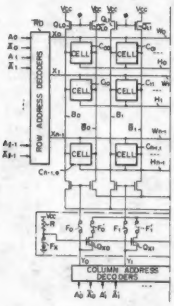
a memory cell array having a plurality of normal memory cell rows or columns each comprising a plurality of memory cells;

at least one redundancy memory cell row or column comprising a plurality of redundancy memory cells, said redundancy memory cell row or column being able to replace one of said normal cell rows or columns including a defective cell;

a plurality of selecting line means, each connected to either

one of said normal memory cell rows or columns, or said redundancy memory cell row or column; and

a plurality of connecting/disconnecting means, each linked between one of said selecting line means and said power



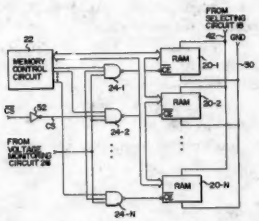
supply means, said connecting/disconnecting means electrically disconnecting said selecting line means from said power supply means for at least a non-selected mode of said device whereby current is prevented from flowing between said power supply means and said memory cells.

4,587,640

CASSETTE TYPE SEMICONDUCTOR MEMORY DEVICE

Yuichi Saitoh, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Nov. 9, 1983, Ser. No. 550,209
Claims priority, application Japan, Nov. 12, 1982, 57-197713
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—229 **9 Claims**



1. A cassette type semiconductor memory device to be coupled to the main frame of a data processor having a main power source, through a connector, comprising:

a volatile semiconductor memory;

an auxiliary power source for back-up;

voltage monitoring means for monitoring the voltage of said main power source supplied from said main frame, and producing a permission signal only when said main power source voltage is a normal value;

memory control means connected between the connector and said semiconductor memory, which sets said semiconductor memory in a stand-by mode when the permission signal is not supplied thereto, and removes the stand-by mode in response to the permission signal to set the memory in a read/write mode; and

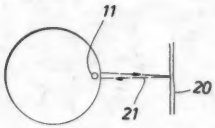
power selecting means for connecting either of said main or auxiliary power source to said semiconductor memory and said memory control means.

4,587,641

DOWNHOLE FRACTURE ANALYSIS

Rocco DiFoggio, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 7, 1984, Ser. No. 577,927
Int. Cl.[4] G01V *1/00, 1/40*
U.S. Cl. 367—30 **7 Claims**



1. A method for detecting fractures in a formation surrounding a borehole wall comprising

irradiating the formation with a broad band width acoustic pulse produced by a transducer in response to a broad band irradiating electrical signal pulse;

receiving the acoustic energy that is reflected from the formation while discriminating by the time of arrival against energy that is reflected from the borehole wall;

converting the received acoustic signal to a corresponding electrical signal;

determining the maxima and minima of the power spectrum of the electrical signal;

determining the frequency difference between two adjacent power spectrum maxima and minima;

calculating the width of the fracture using the frequency difference between peaks in the power spectrum from the expression

$$\Delta f = \frac{V}{2w\sin\theta}$$

wherein

Δf = frequency difference between peaks in the power spectrum

V = velocity of sound in the fluid filling the fracture

w = width of the fracture

θ = angle between beam of acoustic pulse and plane containing the probed region of the fracture

and;

determining the depth of the fracture using velocity of sound in the formation and the time required for the acoustic pulse to travel through the formation and be reflected back.

4,587,642

SEISMIC DATA ENHANCEMENT METHOD AND APPARATUS

William S. Currie, Bellaire, and David R. DeBaun, Houston, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Dec. 6, 1982, Ser. No. 447,039
Int. Cl.[4] G01V *1/00*
U.S. Cl. 367—40 **10 Claims**

1. A method of enhancing the signal to noise ratio of seismic data comprising the steps of

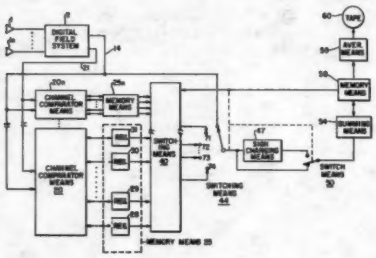
obtaining from at least one array of seismic detectors, an analog signal representative of sensed vibrations or pressure waves,

converting the analog signal to discrete digital values on a time correlation basis,

repeating the preceding steps until a predetermined quantity of analog signals have been converted,

removing at least the two most positive digital values and

the two most negative digital values, for each time correlation, and



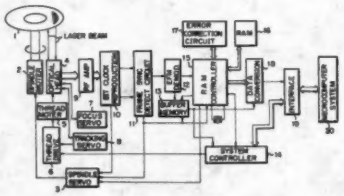
averaging the remaining digital values for each time correlation so as to provide a digital representation of the analog signals.

4,587,643

DISC PLAYBACK APPARATUS

Marinus J. B. M. Monen, Colorado Springs, Colo.; Shunsuke Furukawa, Tokyo, and Tsuneo Furuya, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 27, 1984, Ser. No. 644,264
Claims priority, application Japan, Sep. 1, 1983, 58-161515
Int. Cl.[4] G11B *21/10*
U.S. Cl. 369—32 **19 Claims**



1. Apparatus for use in a system for reproducing a digital information signal including main digital data and subdigital data from an optical digital disc, the main digital data and subdigital data having been recorded together in a common track, comprising:

means connected to receive an information signal reproduced from said disc for generating a write clock signal synchronized therewith;

means for generating a readout clock signal having a fixed period;

first memory means connected to receive said main digital data reproduced from said disc and being connected for writing therein said main digital data in response to said write clock signal, said first memory means being connected for reading out main digital data written therein in response to said readout clock signal;

second memory means connected to write therein said subdigital data reproduced from said disc in response to said write clock signal and arranged for reading out said subdigital data written therein in response to said readout clock signal; and

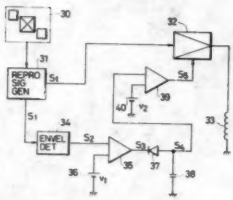
control means for searching a playback location of the main digital data in response to said subdigital data read out from said second memory mean.

4,587,644

TRACKING SERVOCONTROL CIRCUITS FOR REDUCING GAIN TO AVOID TRACKING DEFECT IN AN OPTICAL REPRODUCING APPARATUS

Kazuhiko Fujiie, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 10, 1983, Ser. No. 550,540
Claims priority, application Japan, Nov. 11, 1982, 57-198091; Nov. 19, 1982, 57-204382; Feb. 19, 1983, 58-26625
Int. Cl.[4] G11B *7/095, 21/10*
U.S. Cl. 369—44 **5 Claims**



1. A tracking servocontrol circuit for use in an optical reproducing apparatus; comprising:

signal generating means for producing a tracking error signal representing a tracking error in respect of a light beam scanning a record track on a recorded surface of a record medium from which a reproduced information signal is obtained;

driving means operative to move the position of the light beam on the record medium for tracking servocontrol;

a servocontrol amplifier formed with a gain control terminal and supplied with the tracking error signal for producing a drive signal in response to the tracking error signal and supplying said drive signal to said driving means;

defect detecting means for detecting a variation in the reproduced information signal resulting from a defect on the recorded surface of the record medium and producing a detection output signal corresponding thereto; and

control means operative in response to a predetermined detection output signal of said defect detecting means to supply said detection output signal to said gain control terminal to reduce the gain of said servocontrol amplifier and thereby prevent the drive signal supplied to said driving means from being harmfully affected by the defect on the recorded surface of the record medium.

4,587,645

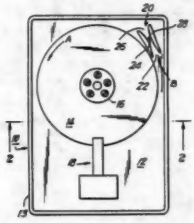
DISC DRIVE ASSEMBLY

Walter Wong, Longmont; Robert Abrams, Boulder; Alan Nagl, Longmont, and William Repphun, Boulder, all of Colo., assignors to MiniScribe Corporation, Longmont, Colo.

Filed May 7, 1984, Ser. No. 607,668
Int. Cl.[4] G11B *5/82*
U.S. Cl. 369—75.1 **22 Claims**

1. In a disc drive assembly having a substantially sealed housing and at least one disc rotatably driven therein to cause a self-contained air flow within said housing by reason of the rotation of said at least one disc, means for establishing a positive air pressure within said housing relative to a minimum air pressure at a predetermined location therein, comprising flow directing means supported on an interior surface of and fully disposed within said housing for intercepting a portion of the self-contained air flow, said flow directing means creating a

minimum pressure at a predetermined location thereof; and means for communicating ambient pressure to said predetermined location, thereby making said minimum pressure substantially equal to ambient pressure.



4,587,646

TONE ARM ASSEMBLY

Robert Graham, 2 Baron Park, Apt. 30, Burlington, Mass. 01803

Continuation of Ser. No. 287,958, Jul. 29, 1981, abandoned, which is a continuation-in-part of Ser. No. 67,264, Aug. 17, 1979, abandoned. This application Apr. 25, 1983, Ser. No. 488,183

Int. Cl.[4] G11B *3/14*

U.S. Cl. 369—248 **14 Claims**

1. A phonograph assembly comprising:

(a) a pivotable tone-arm sub-assembly comprising an elongated tone arm, a counterweight positioned toward one end of said tone arm, and a head shell adapted for mounting a cartridge in an operative position toward the opposite end of said tone arm, said cartridge comprising a stylus fixed to a stylus cantilever, said catridge cantilever having a longitudinal axis;

(b) a unipivot bearing for supporting said sub-assembly for pivotal movement about a pivot point, said pivot point being positioned with respect to the center of gravity of said sub-assembly such that displacing said tone arm sub-assembly and operably positioned cartridge from any given position by pivoting it generates no appreciable force tending to restore said tone arm to said given position; and

(c) lateral balancing means comprising two balancing members extending outwardly from opposite sides of said tone arm sub-assembly, said members being positioned so that an axis running from one said member to the other said member is perpendicular to said stylus cantilever axis and intersects a vertical line through said pivot point slightly below said pivot point;

whereby said assembly is in a balanced condition such that (1) said counterweight can be adjusted to create a desired tracking force, (2) said lateral balancing means defines a preferred vertical pivoting plane perpendicular to said axis running between said lateral balancing members, thus providing a beam balance force resisting rotation of said elongated tone arm about its longitudinal axis and maintaining said stylus cantilever in said preferred pivoting plane during vertical pivoting of said tone arm, and (3) vertical pivoting of the tone arm over a warped record does not generate appreciable restoring force, thus maintaining said tracking force substantially constant during said vertical pivoting.

4,587,647

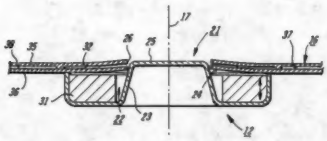
MEDIA SPINDLE CLAMP FOR DISK DRIVES UTILIZING REMOVABLE RECORDING MEDIA

David W. Mak, San Jose, and Terry L. Branson, Cupertino, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 28, 1983, Ser. No. 470,108

Int. Cl.[4] G11B *17/02*

U.S. Cl. 369—270 **5 Claims**



1. In a disk drive utilizing removable recording media having a predetermined nominal inside diameter defined by a central mounting aperture, an improved spindle for supporting said recording media for rotation about a predetermined axis; said spindle comprising

a single piece hub having an elongated, axially extending, conical center post and a rim, said rim being radially displaced from said center post and substantially lying in a plane orthogonal to said axis, said center post having a free end with a relatively narrow diameter to fit through the mounting aperture of said media and being tapered to make radial interference contact with the inside diameter of said recording media in a plane which is essentially parallel to but axially displaced in a predetermined direction from the plane of said rim; and

a radially displaced chuck located between said center post and said rim for supplying axial force to deflect said media axially into seated engagement with said rim.

4,587,648

OPTICAL DISK

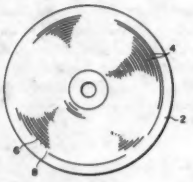
Hideo Ando, Hino, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Aug. 8, 1983, Ser. No. 521,074

Claims priority, application Japan, Aug. 10, 1982, 57-138033; Aug. 26, 1982, 57-146859; Aug. 26, 1982, 57-146860

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—275 **33 Claims**



1. An optical disk comprising:

a disk plate having a light reflective layer;

a tracking guide spirally formed on said light reflective layer of said disk plate so as to establish a guide path for a laser beam irradiating said optical disk,

said tracking guide including plural guide segments separated from one another along said guide path so as to define a respective plurality of flat light-reflective regions between adjacent ones of said guide segments,

each said guide segment being defined by a groove having a predetermined depth h_G; and

preformation pits formed by said light reflective layer of said disk plate and defined in respective ones of said light reflective regions, said preformation pits having a depth h_0 of substantially the same dimension as the predetermined depth h_0 of each said groove of said guide segment.

4,587,649

METHOD OF GROWTH OF A DIGITAL SWITCHBLOCK

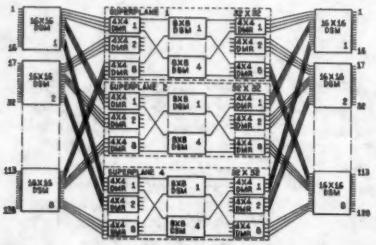
Thomas S. Maddern, Dorset, Great Britain, assignor to The Plessey Company plc, Ilford, England

Continuation of Ser. No. 543,949, Oct. 20, 1983, abandoned. This application Oct. 4, 1985, Ser. No. 783,279

Claims priority, application United Kingdom, Oct. 21, 1982, 8230075

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58 **5 Claims**



1. A method of growth of a digital switchblock under live traffic conditions, for use in telecommunications, said switchblock comprising a plurality of superplanes each including a plurality of central digital switching modules which are interconnected to a plurality of demultiplexer-mixer-remultiplexer stages providing input and output connections for the superplanes; and, a plurality of outer digital switching modules which are connected to the demultiplexer-mixer-remultiplexer stages on each side of the superplanes by way of said connections, wherein the outer digital switching modules are increased linearly as the number of telecommunication lines increase from a first number of telecommunication lines to a third number of telecommunication lines, whereas the central digital switching modules increase thereafter in accordance with a square law growth when the number of telecommunication lines increase from the third number of telecommunication lines; and, wherein the method includes the addition of a number of superplanes and the reconfiguration of a number of receive and transmit links as the number of telecommunication lines increase from the first number of telecommunication lines to a second number of telecommunication lines; and, the addition of twice the additional number of superplanes and the reconfiguration of twice the number of receive and transmit links as the number of telecommunication lines increase from the second number to the third number of telecommunication lines.

4,587,650

METHOD OF SIMULTANEOUSLY TRANSMITTING ISOCHRONOUS AND NONISOCHRONOUS DATA ON A LOCAL AREA NETWORK

John L. Bell, Escondido, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Oct. 30, 1984, Ser. No. 666,474

Int. Cl.[4] H04J *3/00*

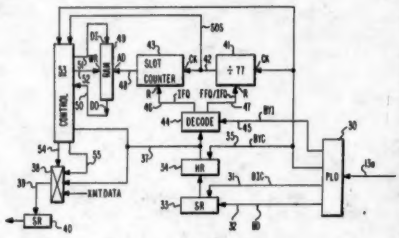
U.S. Cl. 370—86 **12 Claims**

10. A method of transmitting data on a communication network of the type that includes a plurality of stations having respective input and output ports that are serially intercoupled in a loop; said method including the steps of:

circulating around said loop, a single occurence of a unique signal pattern;

counting at a fixed rate in one of said stations starting with the receipt of said unique signal pattern;

writing data onto said loop and storing a signal in said one station representative of the count when said writing occurred;



recounting at said rate in said one station beginning with the next receipt of said unique signal pattern; and

sending onto said loop, when the recount matches the count represented by said stored signal, a control code indicating said data can be removed.

4,587,651

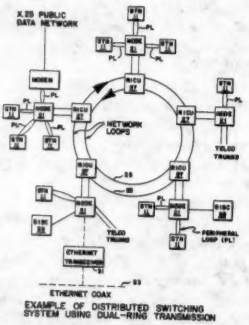
DISTRIBUTED VARIABLE BANDWIDTH SWITCH FOR VOICE, DATA, AND IMAGE COMMUNICATIONS

Gary A. Nelson, Irvine; Patrick N. Godding, Tustin; Richard E. Schumaker, Orange; Keith D. Walter, Irvine; Edward S. Marrone, Los Angeles; Stillman F. Gates, Anaheim; Everett O. Rigsbee, III, San Rafael, and Michael D. Teener, Irvine, all of Calif., assignors to CXC Corporation, Irvine, Calif.

Filed May 4, 1983, Ser. No. 491,551

Int. Cl.[4] H04J *3/00, 3/16;* H04Q *11/04*

U.S. Cl. 370—88 **49 Claims**



EXAMPLE OF DISTRIBUTED SWITCHING SYSTEM USING DUAL-RING TRANSMISSION

1. A variable bandwidth private branch exchange system for interfacing a network ring and a plurality of local stations, said system comprising:

means for communicating a network ring signal stream to an input port of a node connected to the network ring;

means for determining that a local station connected to the node is being addressed by a remote station not connected to the node;

means for assigning a discrete segment of the network ring signal stream for communication between the local station and the remote station such that at least one bit of the assigned segment of the network ring signal stream is used both to transmit data going from the remote station to the

local station and from the local station to the remote station;

means for disabling the normal network ring signal stream path through the node and enabling a network ring communication path to a local station when the assigned segment is accessible at the node, thereby disposing the local station in series electrical connection with the network ring signal stream;

means for disabling the communication path to the local station and enabling the normal network ring signal stream path through the node after passing the assigned segment to the local station; and

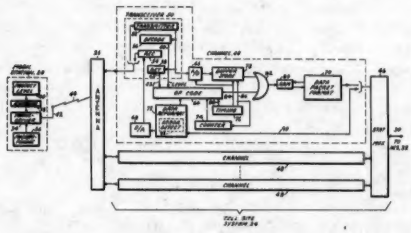
means for extracting the network ring signal stream from the output port of the node.

4,587,652

DATA CONTROL FOR TELEPHONE SYSTEM

Stuart O. Goldman, Columbus, Ohio, assignor to ITT Corporation, New York, N.Y.

Filed Jun. 21, 1984, Ser. No. 622,939
Int. Cl.[4] H04J *3/12*
U.S. Cl. 370—110.1 **12 Claims**



1. In a telephone system, a method of communicating digitized data comprising the steps of:

storing batches of said data from each of a plurality of subscriber stations or cell site base equipment and system control elements prior to transmission of individual batches of said data from a first site to a second site;

in each of said batches, counting segments of said data;

in each of said batches, combining an operational code with said data to provide formatted data, said code including sequencing legends interleaved between successive ones of said segments of data;

storing formatted data of each of said batches in a back-up memory;

multiplexing the formatted data;

transmitting the formatted data from said first site to said second site; and

checking data received at said second site in accordance with one of a plurality of procedures designated by said operational code.

4,587,653

CIRCUIT FOR CONTROLLABLE GENERATION OF PSEUDOERRORS IN BIT PROCESSING

Charles R. Hogge, Jr., Richardson, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

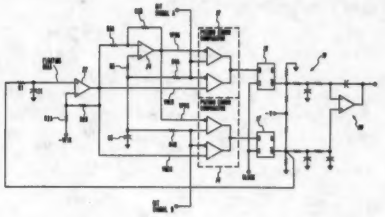
Filed Sep. 30, 1983, Ser. No. 537,909
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—6 **5 Claims**

1. A circuit for generating pseudoerrors, comprising:

means for comparing a bit signal with a pair of threshold values to generate an indication of a pseudoerror whenever the value of the bit signal is within an error region defined by said pair of threshold values;

means for providing a measure of the rate at which indications of pseudoerrors are generated by said comparing means;

first threshold means, referenced to a selected fixed value, for generating a first one of said threshold values so that when said measure of the rate at which pseudoerror indications are generated increases, as referenced to said fixed value, said first threshold value changes so as to contract said error region, and if said measure of the rate of pseudoerror indications decreases, as referenced to said fixed value, said first threshold value changes to expand said error region; and



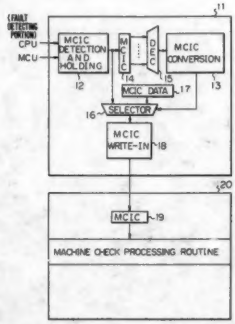
second threshold means for generating a second one of said threshold values so that when the measure of the rate of pseudoerror indications increases, as referenced to said fixed value, said second threshold value changes to contract said error region, and if said measure of the rate of pseudoerror indications decreases, as referenced to said fixed value, said second threshold value changes to expand said error region.

4,587,654

SYSTEM FOR PROCESSING MACHINE CHECK INTERRUPTION

Toshio Matsumoto, Kawasaki, and Motokazu Kato, Sagamihara, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 23, 1983, Ser. No. 554,730
Claims priority, application Japan, Dec. 23, 1982, 57-228855
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—14 **4 Claims**



1. A system for processing machine check interruption, including a data processor which acts upon machine check interruption signals, the data processor detecting the generation of a machine check condition and performing interruption processing on the basis of the machine check interruption signals, said data processor comprising:

specific code detector means, operatively connected to receive the machine check interruption signals, for detect-

ing a specific interruption signal among the machine check interruption signals;

signal converting means, operatively connected to said specific code detector means, for converting the machine check interruption signals into modified code signals when the specific interruption signal is detected by said specific code detector; and

a control portion, operatively connected to said signal converting means, for assuming a disabled-waiting condition in response to the modified code signals, the operation of said data processor being stopped by placing said control portion in the disabled-waiting condition.

4,587,655

FAIL-SAFE SYSTEM FOR VEHICULAR COMPUTER

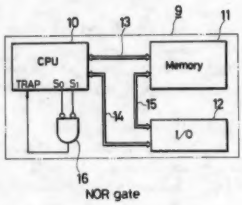
Yoshikazu Hirao, Tokyo, and Shigeo Umesaki, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha and Oki Electric Industry, Co., Ltd., both of Tokyo, Japan

Filed Oct. 12, 1983, Ser. No. 541,207

Claims priority, application Japan, Oct. 12, 1982, 57-179359

Int. Cl.⁴ G06F *11/00, 15/20*

U.S. Cl. 371—12 **4 Claims**



1. A fail-safe computer system for vehicle control, said system comprising:

(a) a CPU means having at least two CPU status information outputs and an interruption request input;

(b) a detecting logic circuit means having the inputs thereof coupled to said status information outputs and having the output thereof coupled to said interruption request input, wherein upon detection of a HALT signal at any of said status outputs by said logic circuit means, said logic circuit means applies an output to said interruption request input whereby said CPU means is reset to its initial state just after power is applied to said system; and

(c) said interruption request input of said CPU means being a top-level priority input and being non-maskable.

4,587,656

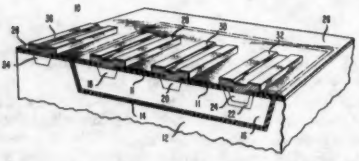
HIGH VOLTAGE SOLID-STATE SWITCH

Adrian R. Hartman, New Providence, N.J.; Terence J. Riley, Wyomissing, Pa., and Peter W. Shackle, West Melborne, Fla., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 107,775, Dec. 28, 1979. This application Mar. 27, 1981, Ser. No. 248,207

Int. Cl.⁴ H01L *29/72*

U.S. Cl. 357—38 **4 Claims**



1. A switching element comprising a semiconductor body whose bulk is of one conductivity type and relatively high resistivity and which includes anode, gate, and cathode regions spaced apart and localized along a common planar surface of the body, each being of relatively low resistivity, a shield region being of higher resistivity than the anode region and surrounding the cathode region so as to separate it from the bulk portion of the semiconductor body, the cathode and gate regions being of the same conductivity type as the bulk and the anode and shield regions being of the opposite conductivity type as the bulk, and separate cathode, anode, and gate electrode, the gate region being located essentially directly between the anode and shield regions, the parameters of the various portions of the switching element being such that with the potential of the anode region being forward biased with respect to the cathode region and the potential of the gate region being insufficient to essentially completely deplete a cross-sectional portion of the bulk of the semiconductor body between the anode and cathode regions there is facilitated a substantial current flow between the anode and cathode regions via the bulk, and with the anode region being forward biased with respect to the cathode region and the potential of the gate region being of sufficiently greater magnitude than that of the anode region to essentially completely deplete a cross-sectional portion of the bulk of the semiconductor body between the anode and cathode regions and to cause this portion of the bulk of the semiconductor body to be at a potential which is greater in magnitude than exists at the anode, cathode and shield regions, there is facilitated an inhibiting or interrupting (cutting off) of current flow between the anode and cathode regions.

4,587,657

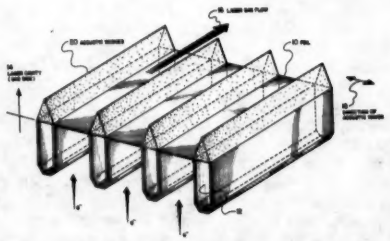
SUPPRESSION OF HIGH-FREQUENCY ACOUSTIC WAVES IN E-BEAM LASERS

James A. Davis, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 16, 1983, Ser. No. 562,306

Int. Cl.⁴ H01S *3/09*

U.S. Cl. 372—74 **10 Claims**



1. In an E-beam-pumped gas laser of the type utilizing a foil to separate the gases in a laser cavity from a vacuum side of the foil, the vacuum side having a plurality of support ribs for supporting the foil against the pressure loads of the flowing laser gas, said support ribs casing electron-beam shadow areas, the improvement comprising:

means for suppressing acoustic waves generated in consequence of the electron-beam shadow areas, said means comprising a plurality of wedges,

each wedge being positioned adjacent to and in alignment with an associated rib on the vacuum side of the foil so that the foil lies between each wedge and its associated support rib, and

each wedge being shaped to occupy the electron-beam shadow area cast by its associated rib.

4,587,658
APPARATUS FOR SEALING ELECTRODES IN ELECTRIC ARC FURNACES

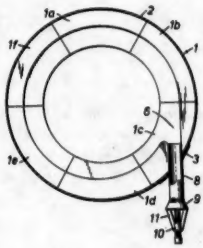
Kevin D. Ball, Grimsby, Canada, and Peter Davies, North Anston, England, assignors to Coated Electrodes Limited, Sheffield, England

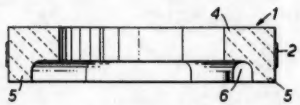
Continuation of Ser. No. 443,852, Nov. 22, 1982, Pat. No. 4,517,678. This application Nov. 30, 1984, Ser. No. 676,883

Claims priority, application United Kingdom, Nov. 20, 1981, 3135012; Jul. 30, 1982, 8222022; Aug. 11, 1982, 8223179

Int. Cl.⁴ H05B 7/12

U.S. Cl. 373—95 **3 Claims**





3. Apparatus for sealing the space between an electrode and an aperture formed in one wall of an electric arc furnace, the apparatus comprising an assembly of a plurality of co-operating segments which are constructed an electrically non-conductive refractory material consisting essentially of alumina and silica and which together define an annular chamber which encompasses but is spaced from the electrode and includes an upper ring-shaped member and a peripheral wall dependent from the radially outer boundary of the upper member, the peripheral wall being formed with at least one passageway which is inclined with respect to the radius of the chamber and is connected to receive gas under pressure from an inlet conduit and to discharge such gas onto and around the encompassed electrode effectively to seal the space between the electrode and the arc furnace wall.

4,587,659
FEED THROUGH STRUCTURE FOR ELECTRODES IN ELECTRIC FURNACES

Karl-Heinz Ungar, Mülheim, and Hermann Cepin, Duisburg, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 21, 1984, Ser. No. 684,674

Claims priority, application Fed. Rep. of Germany, Jan. 2, 1984, 3400186

Int. Cl.⁴ H05B 7/10

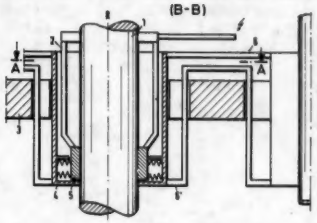
U.S. Cl. 373—96 **5 Claims**

1. Feed through structure for electrodes for passing the electrodes through a furnace cover into the interior of an electro furnace such as an electric arc or reduction furnace, comprising;

a plurality of twin walled, water cooled hollow cylinders made of electrically conductive material, and provided in aperatures in said cover;

electrodes being passed through and received by said hollow cylinders; and

electrically conductive bridges for interconnecting all of said hollow cylinders to the extent they pertain to different phases, said bridges being provided in pairs for connecting the inside ends of the hollowed cylinders as well as the outside ends of the hollow cylinders as far as interior of the furnace is concerned.



4,587,660
DIRECT-CURRENT METALLURGICAL ARC FURNACE AND METHOD OF MELTING WITH SAME

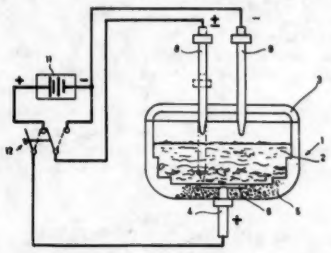
Jean-Pierre Motte, and Ghislain Maurer, both of Metz, France, assignors to Institut de Recherches de la Siderurgie Francaise, Maizieres-les-Metz and Clecim SA, Courbevoie, both of, France

Filed May 3, 1984, Ser. No. 608,024

Claims priority, application France, May 3, 1983, 83 07317

Int. Cl.⁴ H05B 7/20

U.S. Cl. 373—108 **9 Claims**



3. A direct-current electric arc furnace which melts a divided metal charge, the furnace comprising:

a vessel having an upper cover and a lower floor;

a hearth electrode exposed in the vessel generally at the floor thereof;

at least two vault electrodes projecting down into the vessel and both displaceable between an upper position relatively far above the hearth electrode and a lower position relatively close thereto;

a direct-current voltage source having a pair of opposite poles; and

switch means connected between the source and the electrodes oppositely polarizing the vault electrodes as the vault electrodes move from the upper to the lower position and polarizing the hearth electrode oppositely to at least one of the vault electrodes as the vault electrodes move from the lower to the upper position, whereby as the vault electrodes move down they locally melt the charge between them and as they move up they melt the charge between at least the one vault electrode and the hearth electrode.

4,587,661

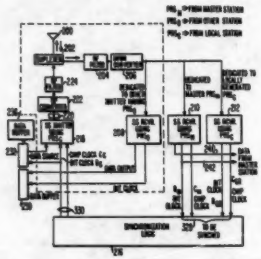
APPARATUS FOR SYNCHRONIZING SPREAD SPECTRUM TRANSMISSIONS FROM SMALL EARTH STATIONS USED FOR SATELLITE TRANSMISSION

Leonard N. Schiff, Lawrenceville, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Mar. 4, 1983, Ser. No. 472,256

Int. Cl.⁴ H04K *1/04*

U.S. Cl. 375—1 **5 Claims**



1. A communication system, employing a satellite which continuously and interatively re-transmits a pseudo-random sequence signal PRS_m having a chip rate C_m and a bit rate B_m, said system comprising:

a plurality of ground stations each having a transmitter and a receiver;

means for transmitting a first pseudo-random sequence signal PRS_G having a first chip rate C_G and a first bit rate B_G from at least one ground station to said satellite;

means at said at least one ground station for receiving and identifying PRS_G after being returned by said satellite as PRS_{Gr} with a chip rate C_{Gr};

means at said at least one ground station for receiving and identifying PRS_m;

means responsive to the phase difference between C_m and C_{Gr} to produce a signal value representative thereof every time period τ; and

means responsive to said signal value to change the chip rate C_{Gr} by an amount which will cause the phase of C_{Gr} to approach the phase of C_m at a rate which will approximate the phase of C_m at the end of the next time period τ.

4,587,662

TDMA SPREAD-SPECTRUM RECEIVER WITH COHERENT DETECTION

Ulrich Langewellpott, Esslingen, Fed. Rep. of Germany, assignor to International Standard Electric Corporation, New York, N.Y.

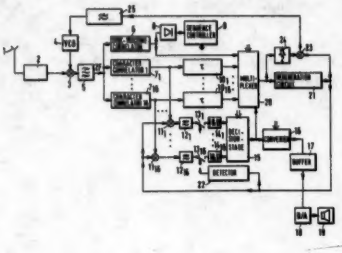
Filed Jan. 25, 1984, Ser. No. 573,785

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1983, 3302828

Int. Cl.⁴ H04B *15/00*

U.S. Cl. 375—1 **8 Claims**

1. Receiver comprising a demodulator which is fed with an IF signal and contains a sync-tracking correlator connected to a sequence controller, and contains m character correlators connected to m character detectors and a decision stage, for fixed and mobile transmitter-receiver stations of a digital radio system employing time division multiple accessing and the spread-spectrum technique, wherein evey n bits to be transmitted are combined to form an n-bit group and encoded by a code character of an m-element alphabet, characterized in that each of the character detectors contains a mixer (11_1–11_{16}) connected to a low-pass-filter (12_1–12_{16}), a sampling switch (13_1–13_{16}), and a cyclically reset integrator (14_1–14_{16}), and that each of the character correlators (7_1–7_{16}) has its output connected to a delay line (10_1–10_{16}) connected to a multiplexer (20) which has one of its inputs connected to the output of the sync-tracking correlator (6), is influenced by the output signal of a decision stage (15), and is connected to a regeneration circuit (21) which has its output connected to a detector (22)



controlling the sampling switches (13_1–13_{16}) and to the mixers (11_1–11_{16}) and applies to the latter a signal having a waveform suitable for phase-coherent mixing.

4,587,663

CONVERSATION DEVICE WITH SPACE AND FEED MOVEMENT RELATED TO ACTUATION TIME OF CONTROL KEY

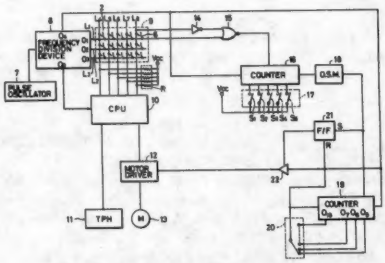
Mikiharu Matsuoka, Tokyo; Hirohiko Katayama, Kawasaki, and Sakae Horyu, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 12, 1982, Ser. No. 367,725

Claims priority, application Japan, Apr. 21, 1981, 56-59131

Int. Cl.⁴ G06M *3/00*

U.S. Cl. 377—2 **31 Claims**



1. A recording medium feeding device comprising:

key means for instructing feeding of a recording medium;

pulse generating means for generating pulses of a predetermined period upon actuation of said key means;

a counter for counting the pulses generated by said pulse generating means;

data setting means for setting a desired value to be counted by said counter; and

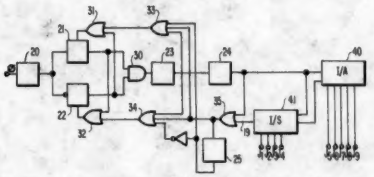
recording medium feeding means for feeding the recording medium a predetermined amount when the count by said counter reaches a value set by said data setting means.

4,587,664

HIGH SPEED FREQUENCY DIVIDER DIVIDING PULSE BY A NUMBER OBTAINED BY DIVIDING AN ODD NUMBER BY TWO

Norihiko Iida, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 21, 1984, Ser. No. 653,109
Claims priority, application Japan, Sep. 21, 1983, 58-174610; Nov. 1, 1983, 58-205204
Int. Cl.[4] H03K *23/42, 23/48, 23/52*
U.S. Cl. 377—48 13 Claims



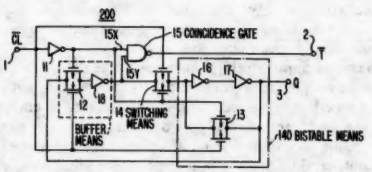
1. A divider comprising:
an input terminal receiving input pulses;
a first divider dividing the frequency of said input pulses received at said input terminal and producing first pulses;
a second divider dividing the frequency of said input pulses received at said input terminal and producing second pulses having a phase different from said first pulses by 90°;
a first means for synthesizing third pulses having a repetition frequency lower than said input pulses from said first and second pulses;
a counter driven by said third pulses;
an output terminal coupled with said counter;
a second means coupled to said counter for selecting one of said first and second pulses in response to the output of said counter; and
a third means coupled to said first means and said first and second dividers and responsive to the selected one of said first and second pulses and the output of said counter for shifting the phase of the other of said first and second pulses by 180°.

4,587,665

BINARY COUNTER HAVING BUFFER AND COINCIDENCE CIRCUITS FOR THE SWITCHED BISTABLE STAGES THEREOF

Hiroshi Minakuchi, Shiga, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 14, 1983, Ser. No. 542,195
Claims priority, application Japan, Oct. 15, 1982, 57-181707; Oct. 25, 1982, 57-187101; Dec. 27, 1982, 57-231367; Dec. 27, 1982, 57-231368; Dec. 27, 1982, 57-231369
Int. Cl.[4] H03K *21/16, 23/42, 23/56*
U.S. Cl. 377—116 7 Claims



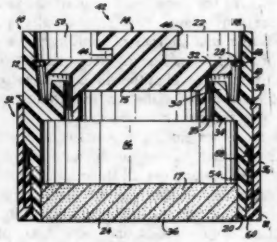
1. A binary counter comprising a plurality of unit stages which are connected in series, each unit stage thereof comprising:
an input terminal being supplied with a clock signal having first and second logical values;
a bistable means coupled to said clock signal input terminal which maintains its output state by closing a coupling loop as a bistable circuit when said clock signal is of said first logical value;
a buffer means coupled to said bistable means output and said clock signal input terminal for generating an output signal corresponding to an output state of said bistable means when said clock signal is of said first logical value;
a switching means coupled between said buffer means and said bistable means for transmitting said output signal of said buffer means to said bistable means when said clock signal is of said second logical value;
a coincidence gate coupled to said buffer means output and said clock signal input terminal for generating an output signal corresponding to an output state of said bistable means and said logical value of said clock signal;
a means connected for supplying said output signal of said coincidence gate to an input terminal of said next unit state for use as a clock signal therefor.

4,587,666

SYSTEM AND A METHOD FOR MOUNTING FILM TO A SAMPLE HOLDER FOR X-RAY SPECTROSCOPIC FLUORESCENCE ANALYSIS

Angelo M. Torrisi, 10 Anpell Dr., Scarsdale, N.Y. 10583, and Roland Urbano, Tuckahoe, N.Y., assignors to Angelo M. Torrisi, Scarsdale, N.Y.

Filed May 3, 1984, Ser. No. 606,565
Int. Cl.[4] G01N *23/223;* G01T *1/36;* H05G *1/00*
U.S. Cl. 378—47 36 Claims



1. A film handling, positioning, and locking system for a vented or closed disposable sample holder for sample materials for spectroscopic fluorescence analysis, comprising, in combination:
a substantially cylindrical body having a substantially annular wall forming a cell adapted to contain said sample material, said wall having a rim portion defining an open face of said cell,
film means positioned across said face of said cell for sealing said face and preventing the passage of said sample material from said cell and for maintaining a taut surface for said sample material for the sample analysis, said film means including a film skirt for engagement with said annular wall of said body,
flexible ring means positioned around a first portion of said annular wall of said body associated with said face, said flexible ring means being for pressing said film skirt to said first portion and for maintaining said film means across said face sufficient to maintain a taut surface of said film means across said face without imposition of undue strain upon the film, and
sleeve means positioned around said annular wall of said body and said ring means and closely spaced radially from said ring means, said sleeve means being for pressing said film skirt to second and third portions of said annular wall

spaced axially outwardly and inwardly respectively from said first portion of said annular wall; for holding said ring means from moving axially from its position around said annular wall of said holder body; and for maintaining the taut surface of said film means across said face of said cell.

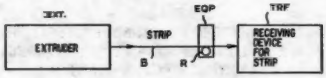
20. A system according to claim 1, wherein said sample material is a liquid.

4,587,667

METHOD AND APPARATUS FOR INSPECTION BY RADIOACTIVE GAGE OF A MOVING STRIP OF MATERIAL, IN PARTICULAR A STRIP OF RUBBER FOR TIRES

Gilles J. N. Osmont, Sartrouville, and Jacques A. Y. Bourras-Laspelades, Villepinte, both of France, assignors to Sereg S.A., Montrouge, France

Filed Dec. 28, 1983, Ser. No. 566,379
Claims priority, application France, Dec. 29, 1982, 82 21987
Int. Cl.[4] G01N *23/00*
U.S. Cl. 378—58 **15 Claims**



1. Method for inspection of a moving strip of material, in particular a strip of rubber, using an ionising-radiation gage, operating in a measurement plane transverse to the axis of movement of the strip, wherein there are provided

on one side of the zone of passage of the strip through the measurement plane, two substantially pointlike, collimated, identical sources of ionising radiation positioned and oriented to define a substantially constant flux of radiation at the level of the zone of passage of the strip, the resulting beam of radiation extending beyond the said zone of passage on both sides,

and, on the other side, adjacent the said zone of passage, detecting means having an elongate active face, disposed to receive substantially all the emitted radiation,

and wherein the variations as the strip moves of the output signal of the detecting means are monitored, whereby to detect without contact and with high precision slight variations in mass of the strip, in particular localised air inclusions, independently of fluctuations in the position of the strip around its mean zone of passage.

4,587,668

X RAY UNIT FOR PODIATRY

William W. Morris, Woodstock, Ill., assignor to X-Cel X-Ray Corporation, Crystal Lake, Ill.

Filed Jul. 2, 1984, Ser. No. 627,293
Int. Cl.[4] H05G *1/02*; F16M *11/12*
U.S. Cl. 378—197 **15 Claims**

1. An X ray unit having an X ray machine spaced from a foot platform and mounting means for mounting the X ray machine whereby it is adapted to be located at various selected positions relative to said platform, said mounting means including:

a vertical mounting means having first and second ends;

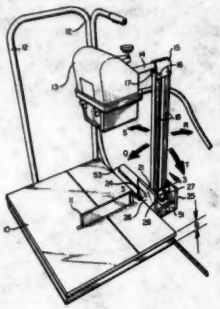
said X ray machine being connected to one end of said vertical mounting means;

a pivotable frame means pivotally connected contiguous to said remaining end of said vertical mounting means whereby said frame means and vertical mounting means pivot in different directions;

a first linking means connected to said remaining end of said vertical mounting means for pivoting said vertical mounting means;

a block means pivotally connected to said first linking means;

a second linking means pivotally connected to said block means; and,



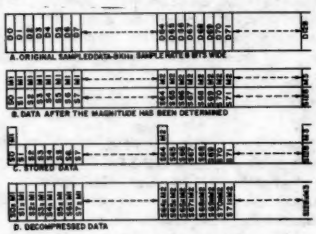
biasing means connected to said second linking means for biasing said vertically mounting means in a normally vertical position.

4,587,669

SPEECH COMPRESSION

Richard J. Gillette, Lincoln County, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

Continuation of Ser. No. 34,767, Apr. 30, 1079, Pat. No. 4,301,333, which is a continuation of Ser. No. 838,387, Sep. 30, 1977, abandoned. This application Aug. 3, 1981, Ser. No. 291,913
Int. Cl.[4] G10L *1/00*
U.S. Cl. 381—32 **8 Claims**



1. A device for compressing audio data, comprising:

means for receiving audio data in digital form;

means for selecting the maximum amplitude of the digital data over some preselected period;

means operatively connected to the maximum amplitude selecting means for encoding a gain factor based on the maximum amplitude; and

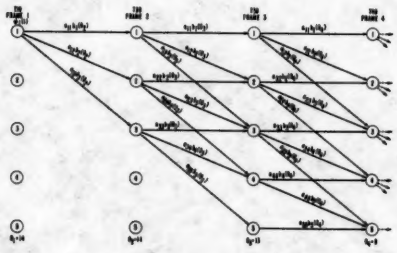
means for applying the gain factor to the digital data so as to remove gain data from the digitized data to obtain a reconstituted compressed data sample having a compression ratio of approximately two-to-one, said last mentioned means having a first input operatively connected to the output side of said gain factor encoding means and a second input adapted to receive the audio data in digitized form for the preselected time period for which the gain factor is determined, said last mentioned means removing the gain factor from the digitized audio data to obtain the compressed data at an output side.

4,587,670

HIDDEN MARKOV MODEL SPEECH RECOGNITION ARRANGEMENT

Stephen E. Levinson, Westfield; Lawrence R. Rabiner, and Man M. Sondhi, both of Berkeley Heights, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 15, 1982, Ser. No. 434,516
Int. Cl.[4] G10L 1/00
U.S. Cl. 381—43 15 Claims



1. A speech analyzer for recognizing an utterance as one of a plurality of reference patterns each having a frame sequence of acoustic feature signals comprising:

means for storing a set of K signals each representative of a prescribed acoustic feature of said plurality of reference patterns;

means for storing a plurality of templates each representative of an identified spoken reference pattern, the template of each spoken reference pattern comprising signals representative of a first state, a last state and a preselected number N−2 intermediate states between said first and last states of a constrained hidden Markov model of said spoken reference pattern, N being independent of the number of acoustic feature frames in the acoustic feature frame sequence of the identified spoken reference pattern, a plurality of first type signals each representative of the likelihood of a prescribed acoustic feature signal of a reference pattern frame being in a predetermined one of said states, and a plurality of second type signals each representative of the likelihood of a transition from a prescribed acoustic feature signal in one of said states to another of said states of said template;

means responsive to the utterance for forming a time frame sequence of acoustic feature signals representative of the speech pattern of the utterance;

means responsive to said utterance feature signal sequence and said stored prescribed acoustic feature signals for selecting a sequence of said prescribed feature signals representative of the utterance speech pattern;

means jointly responsive to said sequence of prescribed feature signals representative of the utterance and the reference pattern template N state constrained hidden Markov model signals for combining said utterance representative sequence of prescribed feature signal sequence with said reference pattern N state Markov model template signals to form a third type signal representative of the likelihood of the unknown utterance being the spoken reference pattern; and

means responsive to the third type signals for the plurality of reference patterns for generating a signal to identify the utterance as one of the plurality of reference patterns.

DESIGN PATENTS

GRANTED MAY 6, 1986

ERRATA

For CLASS	See PATENT NO.
D12–110	283,689

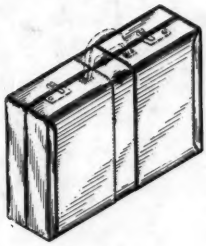
DESIGNS

MAY 6, 1986

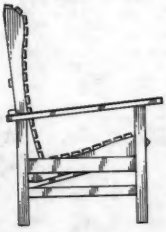
283,652
UMBRELLA SUPPORTING VEST
William E. Hoover, Rte. 10, Box 790A, Salisbury, N.C. 28144; William L. Poole, 405 S. Hudson Ave., Spencer, N.C. 28159, and Walter M. Cloer, 29 Correll Park, Salisbury, N.C. 28144
Filed Sep. 28, 1983, Ser. No. 536,751
Term of patent 14 years
U.S. Cl. D2—190

283,653
BELT BUCKLE
Deborah E. Marinoff, Van Nuys, Calif., assignor to Charmant, Van Nuys, Calif.
Filed May 29, 1984, Ser. No. 615,062
Term of patent 14 years
U.S. Cl. D2—426

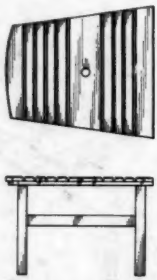
283,654
LUGGAGE CASE
Hyun S. Kim, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.
Filed Apr. 26, 1983, Ser. No. 488,639
Term of patent 14 years
U.S. Cl. D3—76



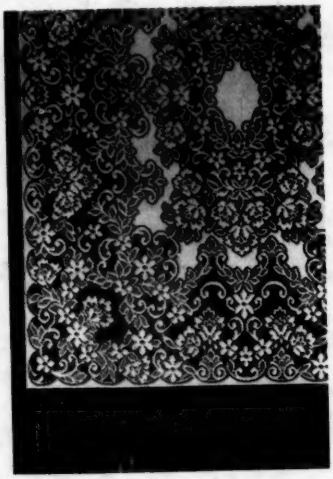
283,655
LAWN CHAIR
David H. Mennes, 2208 Cleveland Rd., Wooster, Ohio 44691
Filed Nov. 21, 1983, Ser. No. 554,052
Term of patent 14 years
U.S. Cl. D6—370



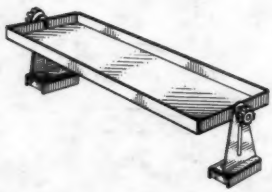
283,656
LAWN TABLE
David H. Meanes, 2208 Cleveland Rd., Wooster, Ohio 44691
Filed Nov. 21, 1983, Ser. No. 554,054
Term of patent 14 years
U.S. Cl. D6—480



283,658
TABLECLOTH
Richard A. Fees, Ardsley, Pa., assignor to Quaker Lace Company, Philadelphia, Pa.
Filed Dec. 1, 1983, Ser. No. 556,858
Term of patent 14 years
U.S. Cl. D6—617



283,657
MAGNETIC MECHANIC'S TRAY OR SIMILAR ARTICLE
Gary E. Chaplin, 295 E. Ceres St., Rialto, Calif. 92376, and Michael A. Keefe, 208 E. Olive Ave., Redlands, Calif. 92373
Filed Jul. 28, 1983, Ser. No. 518,064
Term of patent 14 years
U.S. Cl. D6—511



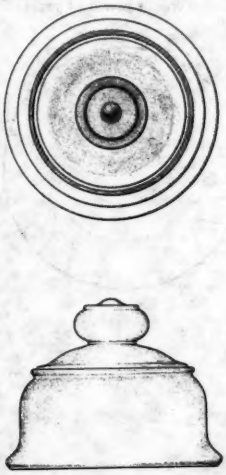
283,659
WINE GLASS
Alfred Blake, Hillsdale, N.J., and Michael Lax, New York, N.Y., assignors to American Commercial, Incorporated, Secaucus, N.J.
Filed Jun. 6, 1983, Ser. No. 501,149
The portion of the term of this patent subsequent to May 6, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

283,660
CHAMPAGNE FLUTE
Alfred Blake, Hillsdale, N.J., and Michael Lax, New York, N.Y., assignors to American Commercial, Incorporated, Secaucus, N.J.
Filed Jun. 6, 1983, Ser. No. 501,169
The portion of the term of this patent subsequent to May 6, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

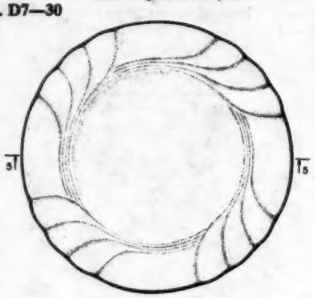
283,661
CHAMPAGNE FLUTE
Alfred Blake, Hillsdale, N.J., and Michael Lax, New York, N.Y., assignors to American Commercial, Incorporated, Secaucus, N.J.
Filed Jun. 6, 1983, Ser. No. 501,290
The portion of the term of this patent subsequent to May 6, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

283,662
CHAMPAGNE GLASS
Alfred Blake, Hillsdale, N.J., and Michael Lax, New York, N.Y., assignors to American Commercial, Incorporated, Secaucus, N.J.
Filed Jun. 6, 1983, Ser. No. 501,291
The portion of the term of this patent subsequent to May 6, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

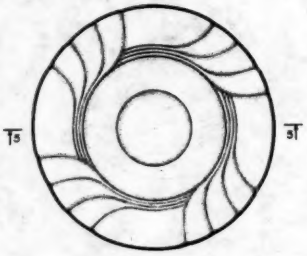
283,663
SUGAR BOWL
Alfred Winterling, Rehau, Fed. Rep. of Germany, assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jan. 16, 1984, Ser. No. 570,868
Term of patent 14 years
U.S. Cl. D7—17



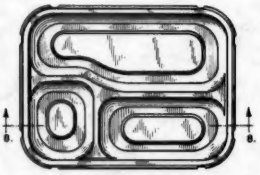
283,664
DINNER PLATE
Toschio Murai, Tajimi, Japan, assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 28, 1983, Ser. No. 518,085
The portion of the term of this patent subsequent to May 6, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—30



283,665
SAUCER
Toschio Murai, Tajimi, Japan, assignor to American Commercial Incorporated, Secaucus, N.J.
Filed Jul. 28, 1983, Ser. No. 518,211
The portion of the term of this patent subsequent to May 6, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—30

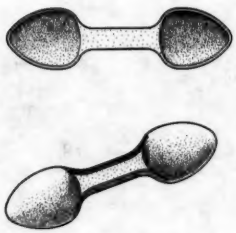


283,666
COMPARTMENTED TRAY
Michael E. Holzkopf, Libertyville, Ill., assignor to Ekco Products, Inc., Wheeling, Ill.
Filed Nov. 7, 1983, Ser. No. 549,074
Term of patent 14 years
U.S. Cl. D7—38

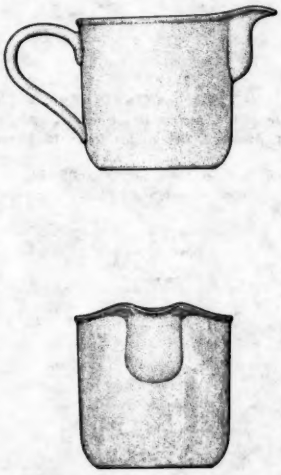


283,667
DECAL FOR A PLATE OR SIMILAR ARTICLE
Steve A. Unger, Manlius, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Dec. 23, 1983, Ser. No. 564,896
Term of patent 14 years
U.S. Cl. D7—39

283,668
SPOON
Rolf M. Dilot, Lund, Sweden, assignor to Tetra Pak International AB, Lund, Sweden
Filed Nov. 30, 1983, Ser. No. 556,566
Claims priority, application Sweden, Jun. 27, 1983, 831731
Term of patent 14 years
U.S. Cl. D7—149

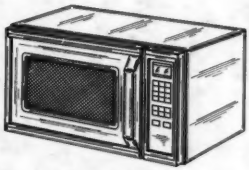


283,669
CREAM PITCHER
Alfred Winterling, Rehau, Fed. Rep. of Germany, assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jan. 16, 1984, Ser. No. 570,867
Term of patent 14 years
U.S. Cl. D7—319

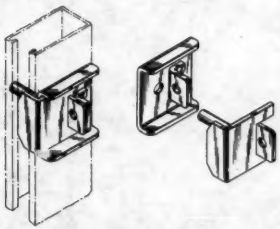


283,670
KETTLE
Michael Lax, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Dec. 27, 1983, Ser. No. 565,963
Term of patent 14 years
U.S. Cl. D7—320

283,671
MICROWAVE OVEN
Takao Miyake, and Kazuo Tsujimoto, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Aug. 24, 1983, Ser. No. 526,092
Term of patent 14 years
U.S. Cl. D7—351



283,672
LATCHING DEVICE FOR ROLLING GATES
Vincent Greco, 195 Huntington Ave., Bronx, N.Y. 10465
Filed May 16, 1983, Ser. No. 495,123
Term of patent 14 years
U.S. Cl. D8—331

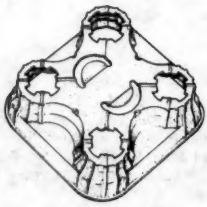


283,673
SAFETY HOOK
Bengt F. A. Berg, Gemla, Sweden, assignor to Stallinfabriken Bridon AB, Sweden
Filed Sep. 30, 1983, Ser. No. 537,597
Term of patent 14 years
U.S. Cl. D8—367

283,674
FOLDABLE HOOK UNIT TO SUPPORT A MEDICAL CONTAINER OR SIMILAR ARTICLE
Joseph R. Paradis, and Edward W. Kaleskas, both of Holden, Mass., assignors to Nypro Inc., Clinton, Mass.
Continuation of Ser. No. 427,487, Sep. 29, 1982, abandoned. This application Jan. 8, 1985, Ser. No. 689,648
Term of patent 14 years
U.S. Cl. D8—373

283,675
SEPARABLE CONDUIT COUPLING OR THE LIKE
Robert Fogel, and Frank Guginsky, both of Commack, N.Y., assignors to Efcor, Inc., East Farmingdale, N.Y.
Continuation-in-part of Ser. No. 481,599, May 4, 1983. This application Jan. 18, 1985, Ser. No. 692,763
Term of patent 14 years
U.S. Cl. D8—396

283,676
BOTTLE CARRIER
Peter K. Kochling, Augusta, Ga., assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Aug. 29, 1983, Ser. No. 527,067
Term of patent 14 years
U.S. Cl. D9—344



283,677
PACKAGING CONTAINER
Vincent E. Fortuna, Huntington Beach, Calif., and Donald N. MacLaughlin, Midland, Mich., assignors to Vercon, Inc., Dallas, Tex.
Filed Apr. 30, 1984, Ser. No. 605,527
Term of patent 14 years
U.S. Cl. D9—349

283,678

PACKAGING CONTAINER

Vincent F. Fortuna, Huntington Beach, Calif., and Donald N. MacLaughlin, Midland, Mich., assignors to Vercon, Inc., Dallas, Tex.

Filed Apr. 30, 1984, Ser. No. 605,526

Term of patent 14 years

U.S. Cl. D9—390

283,679

FOOD CONTAINER OR SIMILAR ARTICLE

Frank S. Tyler, Sevenoaks, England, assignor to Lever Brothers Company, New York, N.Y.

Filed Nov. 21, 1983, Ser. No. 553,671

Claims priority, application United Kingdom, May 25, 1983, 831013272

Term of patent 14 years

U.S. Cl. D9—425

283,680

CLOCK

Walter Henkels, Holunderweg 1, D-5142 Hückelhoven, Fed. Rep. of Germany

Filed Apr. 20, 1984, Ser. No. 602,532

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1984, MR 151

Term of patent 14 years

U.S. Cl. D10—24

283,681

WRISTWATCH

Jean-Pierre Chodat, Auvernier, Switzerland, assignor to Fabrique Ebel, Societe Anonyme, Switzerland

Filed Dec. 29, 1983, Ser. No. 566,720

Claims priority, application World Int. Prop. O., Jun. 29, 1983, DM/002642

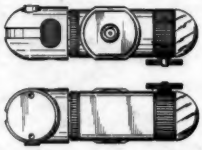
Term of patent 14 years

U.S. Cl. D10—32

283,682
SIGHTING COMPASS/VERTICAL ANGLE METERING DEVICE
Raimo Raitmaa, Kumpulantie 3 A, 00520 Helsinki 52, Finland
Filed Nov. 15, 1983, Ser. No. 551,831
Term of patent 14 years
U.S. Cl. D10—62

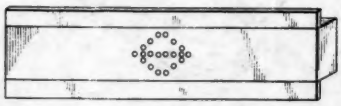
283,683
SIGHTING COMPASS/VERTICAL ANGLE METER
Raimo Raitmaa, Kumpulantie 3 A, 00520 Helsinki 52, Finland
Filed Nov. 15, 1983, Ser. No. 551,830
Term of patent 14 years
U.S. Cl. D10—62

283,684
PERSONAL SECURITY ALARM
Paul S. Francis, 4603 Homestead Dr., Prairie Village, Kans. 66208
Filed Aug. 13, 1984, Ser. No. 640,299
Term of patent 14 years
U.S. Cl. D10—106

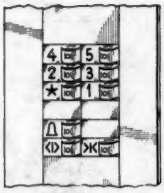


283,685
ELEVATOR HALL CALL PANEL
Ludwig Walser, Oberrohrdorf, Switzerland, assignor to Inventio AG, Hergiswil, Switzerland
Filed Dec. 3, 1984, Ser. No. 677,567
Claims priority, application World Int. Prop. O., Jun. 1, 1984, 003832
Term of patent 14 years
U.S. Cl. D10—108

283,686
HALL INDICATOR PANEL FOR ELEVATORS
Ludwig Walser, Oberrohrdorf, Switzerland, assignor to Inventio AG, Hergiswil, Switzerland
Filed Dec. 3, 1984, Ser. No. 677,572
Claims priority, application World Int. Prop. O., Jun. 8, 1984, 003832
Term of patent 14 years
U.S. Cl. D10—108

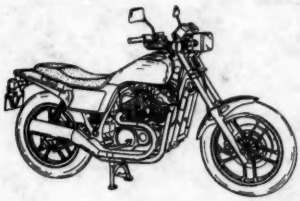


283,687
ELEVATOR CAR OPERATING PANEL
Ludwig Walser, Oberrohrdorf, Switzerland, assignor to Inventio AG, Hergiswil, Switzerland
Filed Dec. 3, 1984, Ser. No. 677,573
Claims priority, application World Int. Prop. O., Jun. 8, 1984, 003832
Term of patent 14 years
U.S. Cl. D10—108

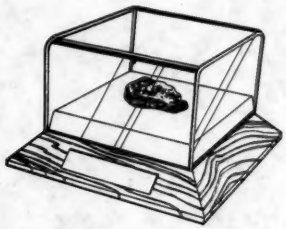


283,688
EMBLEM FOR JEWELRY
Albert T. Ahee, 31500 Harper Ave., St. Clair Shores, Mich. 48082
Filed Aug. 31, 1983, Ser. No. 528,187
Term of patent 14 years
U.S. Cl. D11—61

283,689
MOTORCYCLE
Koji Nakano; Matsuo Hirose, and Toshiyuki Yamada, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 31, 1983, Ser. No. 462,199
Term of patent 14 years
U.S. Cl. D12—110



283,690
NOVELTY TABLE ORNAMENT
Harold E. McCollum, E11422 19th Ave., Spokane, Wash. 99206
Filed Oct. 5, 1983, Ser. No. 539,292
Term of patent 14 years
U.S. Cl. D11—157



283,691
BEAR SCULPTURE
Robert L. Bell, II, 9880 Monroe, Dallas, Tex. 75220
Filed Aug. 25, 1983, Ser. No. 526,166
Term of patent 14 years
U.S. Cl. D11—158

283,692

AUTOMOBILE

Werner Breitschwerdt, Stuttgart; Friedrich van Winsen, Kirchheim, and Bruno Sacco, Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Jun. 15, 1983, Ser. No. 504,448

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, MR 5546

Term of patent 14 years

U.S. Cl. D12—92

283,693

TIRE

Johann Haas, and Ernst Mader, both of Munich, Fed. Rep. of Germany, assignors to Metzeler Kautschuk GmbH, Munich, Fed. Rep. of Germany

Filed May 18, 1983, Ser. No. 495,772

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1982, 13 188

Term of patent 14 years

U.S. Cl. D12—140

283,694

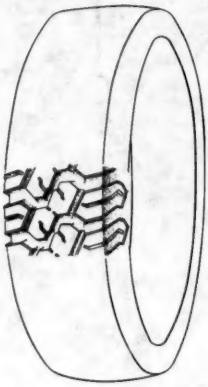
PNEUMATIC TIRE TREAD AND BUTTRESS

Gerasimos Candiliotis, Grosse Pointe Farms, Mich., assignor to Uniroyal Tire Company, Inc., Middlebury, Conn.

Filed Nov. 9, 1983, Ser. No. 550,687

Term of patent 14 years

U.S. Cl. D12—146



283,695

TIRE

Hamish C. Walker, Aachen; Hans-Jürgen Vögler, Herzogenrath; Dionysius J. Poque, Aachen; Manfred Gerresheim, Würselen, and Gerhard F. Senger, Roetgen-Rott, all of Fed. Rep. of Germany, assignors to Uniroyal Englebert Reifen GmbH, Aachen, Fed. Rep. of Germany

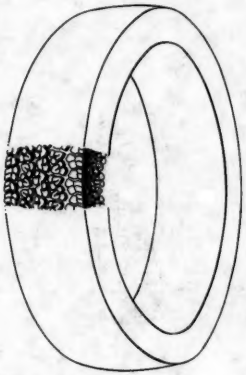
Filed Feb. 9, 1984, Ser. No. 578,487

Claims priority, application Fed. Rep. of Germany, Aug. 15, 1983, MR 3325

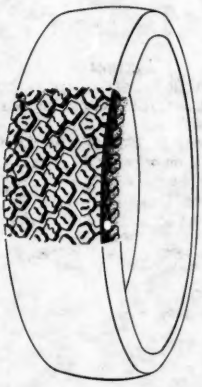
Term of patent 14 years

U.S. Cl. D12—146

283,696
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerasimos Candiliotis, Grosse Pointe Farms, Mich., assignor to Uniroyal Tire Company, Inc., Middlebury, Conn.
Filed Nov. 9, 1983, Ser. No. 550,679
Term of patent 14 years
U.S. Cl. D12—147

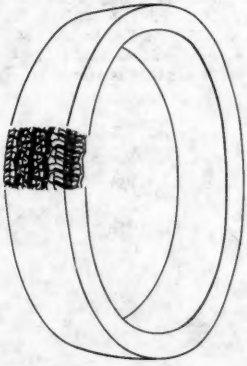


283,697
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerasimos Candiliotis, Grosse Pointe Farms, Mich., assignor to Uniroyal Tire Company, Inc., Middlebury, Conn.
Filed Nov. 9, 1983, Ser. No. 550,686
Term of patent 14 years
U.S. Cl. D12—147

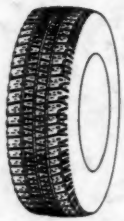


283,698
AUTOMOBILE TIRE
Misao Kawabata, Saitama, and Koujiro Yamaguchi, Tokyo, both of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan
Filed Dec. 15, 1983, Ser. No. 561,706
Claims priority, application Japan, Jul. 25, 1983, 58-32273
Term of patent 14 years
U.S. Cl. D12—147

283,699
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerasimos Candiliotis, Grosse Pointe Farms, Mich., assignor to Uniroyal Tire Company, Inc., Middlebury, Conn.
Filed Jan. 30, 1984, Ser. No. 575,358
Term of patent 14 years
U.S. Cl. D12—147



283,700
TIRE
Jan G. Jansen Schoonhoven, Rozendaal, Netherlands, assignor to Vredestein Banden B.V., Netherlands
Filed Feb. 16, 1984, Ser. No. 580,802
Claims priority, application Hague, Aug. 23, 1983, DMA/000220
Term of patent 14 years
U.S. Cl. D12—147



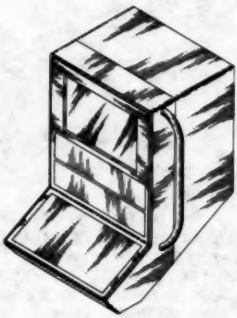
283,701
MOTORCYCLE TIRE
Kazushige Ikeda, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Kobe, Japan
Filed Apr. 23, 1984, Ser. No. 602,688
Claims priority, application Japan, Oct. 27, 1983, 58-46912
Term of patent 14 years
U.S. Cl. D12—147

283,702
MOTORCYCLE TIRE
Hideyuki Teramoto, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Kobe, Japan
Filed Apr. 25, 1984, Ser. No. 603,734
Claims priority, application Japan, Feb. 28, 1984, 59-7373
Term of patent 14 years
U.S. Cl. D12—147

283,703
TIRE
Jan G. Jansen Schoonhoven, Rozendaal, Netherlands, assignor to Vredestein Banden B.V., Netherlands
Filed Jun. 7, 1984, Ser. No. 618,339
Claims priority, application Hague, Dec. 14, 1983, DMA/000245
Term of patent 14 years
U.S. Cl. D12—147

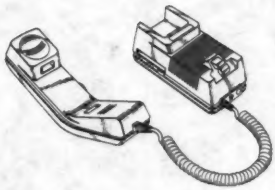
283,704
RAISED DECK SPORT ROOF FOR A VAN
Bob J. Higgins, Elkhart, Ind., assignor to Trans-Aire International, Inc., Elkhart, Ind.
Filed May 13, 1983, Ser. No. 494,440
Term of patent 14 years
U.S. Cl. D12—156

283,705
CONTROL PANEL
Peter H. Cook, Wivenhoe, and Brian R. Lunt, St. Albans, both of England, assignors to The 600 Group Public Limited Company, Middlesex, England
Filed Apr. 1, 1983, Ser. No. 481,575
Claims priority, application United Kingdom, Sep. 24, 1982, 1008879
Term of patent 14 years
U.S. Cl. D13—12



283,706
CONTROL PANEL AND PEDESTAL FOR AUTOMATIC PARTS MANIPULATOR
Keith Barrett, Langwarrin, Australia, assignor to Dart & Kraft, Inc., Northbrook, Ill.
Filed Jan. 9, 1984, Ser. No. 569,124
Term of patent 14 years
U.S. Cl. D13—12

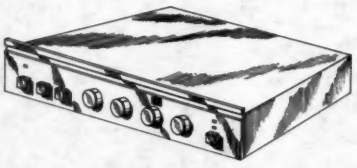
283,707
MOBILE TELEPHONE SET
John W. Goodin, Long Beach; Douglas H. Grambush, South Laguna, both of Calif., and Takeo Nishi, Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Jan. 31, 1984, Ser. No. 575,670
Term of patent 14 years
U.S. Cl. D14—53



283,708
TELEPHONE SET
Shuichi Tamura, Kanagawa, Japan, assignor to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Feb. 16, 1984, Ser. No. 580,670
Claims priority, application Japan, Aug. 18, 1983, 58-36147
Term of patent 14 years
U.S. Cl. D14—53

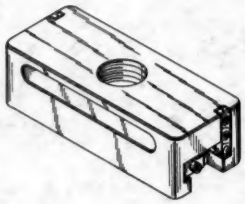
283,709
TELEPHONE INSTRUMENT
Edward A. Williams, Leamington Spa, and Michael Kalas, New Cubbington, Nr. Leamington Spa, both of England, assignors to British Telecommunications, London, England
Filed Sep. 26, 1983, Ser. No. 535,936
Claims priority, application United Kingdom, Mar. 25, 1983, 1012152
Term of patent 14 years
U.S. Cl. D14—64

283,710
SATELLITE RADIO RECEIVER
Ronald E. Wysong, Centerville; Raymond L. Midkiff, Germantown; Joe E. Shafer; Stephen C. Koogler, both of Spring Valley, and Merl Powell, Lebanon, all of Ohio, assignors to R. L. Drake Company, Miamisburg, Ohio
Filed Jan. 5, 1984, Ser. No. 568,177
Term of patent 14 years
U.S. Cl. D14—71



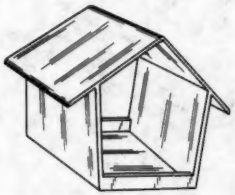
283,711
DATA ENTRY TERMINAL
Naoki Deura; Masashi Tani, and Kenzo Mio, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Dec. 29, 1983, Ser. No. 566,763
Claims priority, application Japan, Jul. 15, 1983, 58-30999
Term of patent 14 years
U.S. Cl. D14—100

283,712
ADJUSTABLE HOLE CUTTER HOUSING
Myron B. Mittleman, 35 Sutton Pl., New York, N.Y. 10022
Continuation-in-part of Ser. No. 312,751, Oct. 19, 1981, Pat. No. Des. 279,477. This application Mar. 10, 1983, Ser. No. 474,244
Term of patent 14 years
U.S. Cl. D15—139

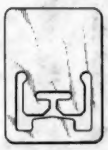


283,713
SINGLE-LENS REFLEX CAMERA BODY
Yoshihisa Maitani, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Japan
Filed Jul. 25, 1983, Ser. No. 516,754
Claims priority, application Japan, Feb. 25, 1983, SHO/58-7586
Term of patent 14 years
U.S. Cl. D16—8

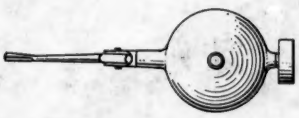
283,714
DESK RECEPTACLE FOR PAPERCLIPS AND SUNDRIES
John K. Petroulias, East Hampton, N.Y., assignor to Techreations, Inc., Fairview Heights, Ill.
Filed Aug. 3, 1983, Ser. No. 519,978
Term of patent 14 years
U.S. Cl. D19—75



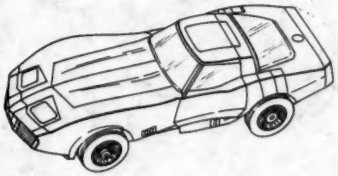
283,715
IDENTIFICATION TAG OR SIMILAR ARTICLE
Samuel L. Kayen, 12168 Marisol Way, and George Smilow, 16821 Pinata Dr., both of San Diego, Calif. 92128
Filed Nov. 17, 1983, Ser. No. 552,718
Term of patent 14 years
U.S. Cl. D20—27

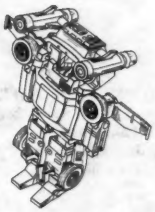


283,716
MECHANICAL GOLF CLUB SWINGER
William W. Seidel, 10930 Avenida Del Gato, San Diego, Calif. 92126
Filed Oct. 3, 1983, Ser. No. 538,282
Term of patent 14 years
U.S. Cl. D21—11

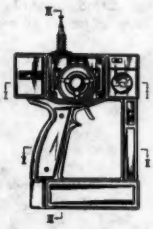


283,717
COMBINED RECONFIGURABLE TOY VEHICULAR AND SIMULATIVE MOTOR UNITS
Hiroyuki Obara, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed May 30, 1984, Ser. No. 616,421
Claims priority, application Japan, Mar. 21, 1984, 59-10888
Term of patent 14 years
U.S. Cl. D21—136





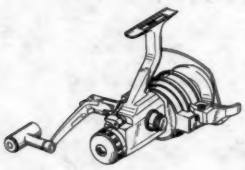
283,718
CONTROLLER BOX FOR ELECTRIC MODEL CARS
Yoshio Kondo, Room No. 311, Eruarukasaru Nishinippori, No. 29-11, Nishinippori 6-chome, Arakawa-Ku, Tokyo, Japan
Filed Apr. 20, 1983, Ser. No. 486,967
Term of patent 14 years
U.S. Cl. D21—141



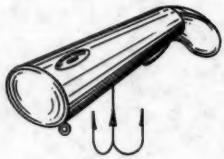
283,719
ANIMAL FIGURE
Nancy M. Walsh, Rte. 1, Box 84, Isanti, Minn. 55040
Filed Dec. 16, 1983, Ser. No. 562,294
Term of patent 14 years
U.S. Cl. D21—148

283,720
PISTOL GRIP BAIT CASTING HANDLE
Brad J. Benit, Spirit Lake, Iowa, assignor to Berkley and Company, Inc., Spirit Lake, Iowa
Filed Jun. 8, 1983, Ser. No. 502,228
Term of patent 14 years
U.S. Cl. D22—23

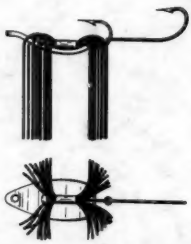
283,721
FISHING REEL
Kanji Iinuma, and Yasuhisa Kameda, both of Tokyo, Japan, assignors to Daiwa Seiko Inc., Tokyo, Japan
Filed Dec. 14, 1983, Ser. No. 561,255
Claims priority, application Japan, Jun. 24, 1983, 58-27319
Term of patent 14 years
U.S. Cl. D22—25



283,722
TOP WATER FISH LURE
Robert F. Zilz, and Randy R. Zilz, both of 615 Island Dr., Union Lake, Mich. 48085
Filed Mar. 28, 1983, Ser. No. 479,831
Term of patent 14 years
U.S. Cl. D22—27



283,723
TOP-WATER FISHING LURE
John Van De Riet, Jr., 4615 Kramer Dr., Affton, Mo. 63123
Filed Feb. 15, 1984, Ser. No. 580,377
Term of patent 14 years
U.S. Cl. D22—27



283,724
FISHING LURE
Donald H. Bass, 31764 Rosslyn, Garden City, Mich. 48135
Filed Mar. 8, 1984, Ser. No. 587,489
Term of patent 14 years
U.S. Cl. D22—27

283,725

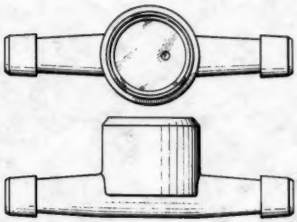
HOUSING FOR AN IN-LINE PRESSURE RELIEF VALVE

Michael R. Mahoney, Cucamonga, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jun. 10, 1983, Ser. No. 503,372

Term of patent 14 years

U.S. Cl. D23—19



283,726

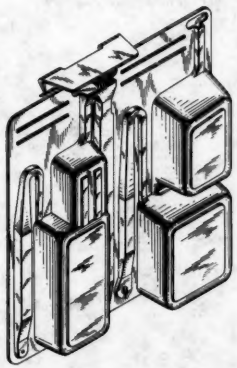
TOILET TANK DISPENSER

David A. Jones, Kettering, Ohio, and Randall G. Richards, Madison, Conn., assignors to The Drackett Company, Cincinnati, Ohio

Filed Sep. 12, 1983, Ser. No. 531,311

Term of patent 14 years

U.S. Cl. D23—3



283,727

OILSTOVE

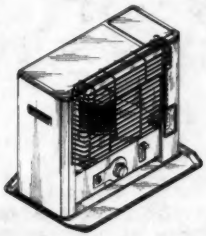
Nobuyuki Kojima; Youichi Sekigawa, both of Kamo, and Makoto Kobiyama, Niigata, all of Japan, assignors to Toshiba Heating Appliances Co., Ltd., Niigata, Japan

Filed Mar. 7, 1984, Ser. No. 587,236

Claims priority, application Japan, Dec. 12, 1983, 58-53329; Dec. 12, 1983, 58-53330

Term of patent 14 years

U.S. Cl. D23—122



283,728

CONTAINER FOR A SAMPLE OF LIQUID SERUM OR THE LIKE

Takayuki Aihara, Hachioji, Japan, assignor to Olympus Optical Co. Ltd., Tokyo, Japan

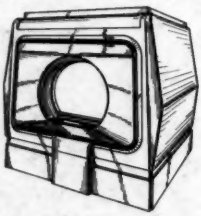
Filed Mar. 7, 1983, Ser. No. 472,623

Claims priority, application Japan, Sep. 6, 1982, 57-40640

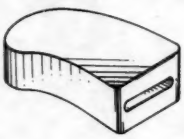
Term of patent 14 years

U.S. Cl. D24—29

283,729
NUCLEAR MAGNETIC RESONANCE IMAGING SYSTEM MAGNET HOUSING
Roger H. Ramsey, Wadsworth, Ohio, assignor to Technicare Corporation, Solon, Ohio
Filed Apr. 13, 1983, Ser. No. 484,722
Term of patent 14 years
U.S. Cl. D24—1.1



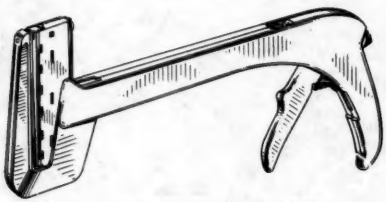
283,730
MOLDED QUADRANT BASE DENTAL CAST
Ronald E. Huffman, Tuscon, Ariz., assignor to KV33 Corporation, Tucson, Ariz.
Filed Apr. 25, 1983, Ser. No. 488,016
The portion of the term of this patent subsequent to Apr. 29, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D24—16



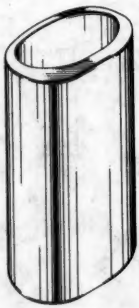
283,731
FEMORAL HIP PROSTHESIS
Robert V. Kenna, Hackensack, N.J., assignor to Howmedica, Inc., New York, N.Y.
Filed Jun. 6, 1983, Ser. No. 501,326
Term of patent 14 years
U.S. Cl. D24—33

283,732
BREAST PUMP
Karen Elliott, Shaker Heights, Ohio, assignor to Medela, Inc., Crystal Lake, Ill.
Filed Oct. 3, 1983, Ser. No. 538,147
Term of patent 14 years
U.S. Cl. D24—23

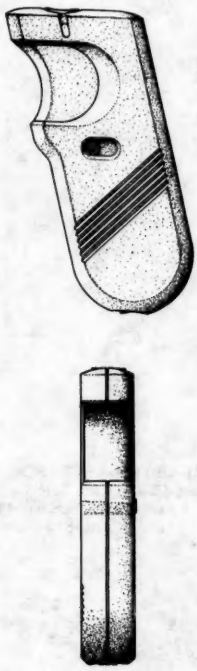
283,733
LINEAR SURGICAL FASTENER APPLIER
Paul O. Rawson, Easton, and Richard Yagami, Bridgewater, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.
Filed Oct. 4, 1983, Ser. No. 538,933
Term of patent 14 years
U.S. Cl. D24—26



283,734
CASE FOR CIGARETTE LIGHTERS
Joseph R. Parren, 19638 N. 34th Dr., Phoenix, Ariz. 85027
Filed Nov. 14, 1983, Ser. No. 551,427
Term of patent 14 years
U.S. Cl. D27—51



283,735
LIGHTER
Kenneth H. Grange, London, England, assignor to Wilkinson Sword Limited, Buckinghamshire, England
Filed Sep. 4, 1984, Ser. No. 647,049
Claims priority, application United Kingdom, Jun. 14, 1984, 1020295
Term of patent 14 years
U.S. Cl. D27—42

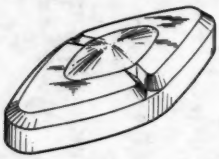


283,736
ELECTRIC HAIR TRIMMER
Gregory S. Wahl; Randy L. Miller, both of Sterling, and Kenneth M. Hattori, Bensenville, all of Ill., assignors to Wahl Clipper Corporation, Sterling, Ill.
Filed Jan. 24, 1984, Ser. No. 573,834
Term of patent 14 years
U.S. Cl. D28—53

283,737
FACIAL MASK
David L. Thibodeau, P.O. Box 457, 8314 Whisper Way, West Chester, Ohio 45069, and Thomas E. Strohmaier, 2431 Ingleside Pl., Cincinnati, Ohio 45206
Filed Aug. 9, 1984, Ser. No. 639,103
Term of patent 14 years
U.S. Cl. D28—9

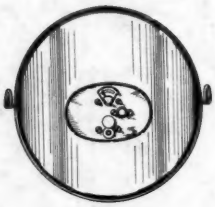
283,738
APPLIANCE FOR SMOOTHING FIBER APPLIED TO FINGERNAILS
Brenda J. Kilman, 420 W. 41st St., San Bernardino, Calif. 92407, and Betty J. Cowart, 751 S. Sycamore, Rialto, Calif. 92376
Filed Aug. 27, 1984, Ser. No. 644,578
Term of patent 14 years
U.S. Cl. D28—59

283,739
PHARMACEUTICAL TABLET
Geoffrey D. Tovey, Harpenden, England, assignor to Smith Kline & French Laboratories Limited, Welwyn Garden City, England
Filed Dec. 28, 1984, Ser. No. 687,335
Claims priority, application United Kingdom, Jul. 2, 1984, 1020679
Term of patent 14 years
U.S. Cl. D28—2

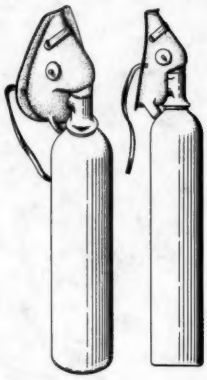


283,740
FIRST STAGE DIVING REGULATOR
Carl J. Wiesinger, II, La Palma, and John McMunn, Laguna Hills, both of Calif., assignors to U.S.D. Corp, Santa Ana, Calif.
Filed Mar. 21, 1983, Ser. No. 477,022
Term of patent 14 years
U.S. Cl. D29—6

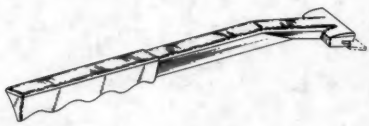
283,741
PORTABLE OXYGEN RESERVOIR
Selby D. Hussey, Vernon Hills, Ill., and John J. Cowley, Toronto, Canada, assignors to Erie Manufacturing Co., Milwaukee, Wis.
Filed Apr. 29, 1983, Ser. No. 490,215
Term of patent 14 years
U.S. Cl. D29—6



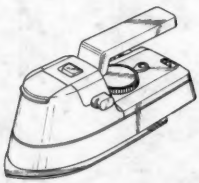
283,742
COMBINED BREATHING MASK AND CONTAINER THEREFORE
Lester B. Hall, 249 Kinsey Ave., Kenmore, N.Y. 14217
Filed May 26, 1983, Ser. No. 498,491
Term of patent 14 years
U.S. Cl. D29—6



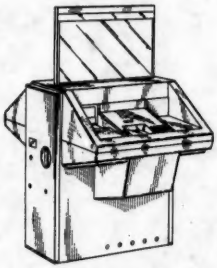
283,743
HOLDER FOR A SCRAPER BLADE
Richard M. Moser, 1039 Merrill, Lincoln Park, Mich. 48146
Filed Apr. 4, 1983, Ser. No. 481,613
Term of patent 14 years
U.S. Cl. D32—48



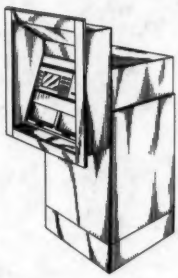
283,744
ELECTRIC IRON
Masao Watanabe, Osaka, and Toshiki Kubo, Hyogo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed May 7, 1984, Ser. No. 607,916
Claims priority, application Japan, Feb. 15, 1984, 59-5127
Term of patent 14 years
U.S. Cl. D32—69



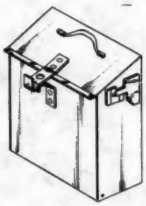
283,745
CUSTOMER-OPERATED CASH DISPENSER
Stuart M. Jenkins, Bognor Regis, and John J. Weaver, Reading, both of England, assignors to De La Rue Systems Limited, Portsmouth, England
Filed Aug. 10, 1983, Ser. No. 521,824
Claims priority, application United Kingdom, Jun. 21, 1983, 1013670
Term of patent 14 years
U.S. Cl. D99—28



283,746
AUTOMATIC TELLER MACHINE
Hirakata Kobayashi, Osaka, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan
Filed Nov. 1, 1983, Ser. No. 547,717
Term of patent 14 years
U.S. Cl. D99—28



283,747
MAIL BOX
Freda Margiloff, 26 Windmill Rd., Armonk, N.Y. 10504
Filed May 27, 1983, Ser. No. 441,959
Term of patent 14 years
U.S. Cl. D99—33



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF MAY, 1986

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A.A.R.C. (Management) Pty. Limited: *See—*
Keith, Donald G., 4,587,147, Cl. 428-59.000.

A.M.S.E.A. - Azienda Meccanica Stampaggi e Attrezzature S.p.A.: *See—*
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AB Akerlund & Rausing: *See—*
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AB Asea-Atom: *See—*
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AB Volvo: *See—*
Andersson, Olle; and Morner, Bengt L., 4,586,472, Cl. 123-401.000.

Abe, Shunzo: *See—*
Shinohara, Kazuhiro; Abe, Shunzo; and Miyake, Hideo, 4,586,996, Cl. 522-7.000.

Abrams, Robert: *See—*
Wong, Walter; Abrams, Robert; Nagl, Alan; and Repphun, William, 4,587,645, Cl. 369-75.100.

Abu-Shumays, Ibrahim K.; and Abu-Shumays, Mary D. Star prism puzzles. 4,586,713, Cl. 273-153.00S.

Abu-Shumays, Mary D.: *See—*
Abu-Shumays, Ibrahim K.; and Abu-Shumays, Mary D., 4,586,713, Cl. 273-153.00S.

Ackermann, Peter; Gsell, Laurenz; and Kohler, Boris, to Ciba-Geigy Corporation. Isomers of 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid-α-methyl-(6-phenoxy-2-picolyl)ester, processes for producing them, and their use for controlling pests. 4,587,255, Cl. 514-345.000.

Acs, Tibor: *See—*
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.

Adair, Paul C.; Lee, Chuan; and Loel, Frank D., to Mead Corporation, The. Photosensitive material employing microcapsules having different photographic speeds. 4,587,194, Cl. 430-138.000.

Adams, Denton D. Game call. 4,586,912, Cl. 446-397.000.

Adams, Kenneth J.; and Dyke, David E., to Imperial Clevite Inc. Method of bonding a high temperature resistant polymeric material to an aluminum base substrate. 4,586,977, Cl. 156-308.600.

Adams, Thomas P.: *See—*
Taipale, Dale L.; Winkelman, John H.; and Adams, Thomas P., 4,586,522, Cl. 133-3.00E.

Adamson, Lee E., to Special Equipment Companies, Inc., Taylor Freezer Division. Cooking apparatus for two-sided cooking. 4,586,428, Cl. 99-332.000.

Adatto, Maurice; and Coste, Christian, to Degremont. Power supply for ozone generator. 4,587,591, Cl. 361-235.000.

Adler, Richard J., to Mission Research Corporation. Ion implantation source and device. 4,587,430, Cl. 250-423.00R.

Adolphs, Peter: *See—*
Gardziella, Arno; Schwieger, Karl-Heinz; Adolphs, Peter; and Grossmann, Gerhard, 4,587,291, Cl. 524-595.000.

AE PLC: *See—*
Allen, Gordon L.; Munro, Robert; and Day, Roger A., 4,586,553, Cl. 164-30.000.

Affiliated Hospital Products, Inc.: *See—*
Walldorf, Diann, 4,586,622, Cl. 215-256.000.

Agatahama, Shunichi; and Yamashita, Shoichi, to Omron Tateisi Electronics Co. Polarized electromagnetic relay. 4,587,501, Cl. 335-80.000.

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Katsumata, Tooru; Terashima, Kazutaka; Nakajima, Hiroaki; and Fukuda, Tsuguo, 4,586,979, Cl. 156-601.000.

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Agrawal, Dinesh K.; Stubican, Vladimir S.; and Mehrotra, Yogesh, to Perkin-Elmer Corporation, The. Method of manufacturing low thermal expansion modified cordierite ceramics. 4,587,067, Cl. 264-63.000.

Ahl, Elvin L., Jr., to United States of America, National Aeronautics and Space Administration. Latching mechanism for deployable/restowable columns useful in satellite construction. 4,587,526, Cl. 343-883.000.

Ahmed, Hassan J.; and Fogg, James L., to Westinghouse Electric Corp. Scanning system for bar code labels affixed to rods. 4,587,407, Cl. 235-467.000.

Aida, Hiroyuki: *See—*
Matsui, Tatsuhiko; Aida, Hiroyuki; Watanabe, Akira; and Oohazama, Tsuneyoshi, 4,586,579, Cl. 180-69.210.

Aiken, John A., Jr.: *See—*
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Aiko, Takuya: *See—*
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Aimoto, Michiyuki: *See—*
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Harper, George S., 4,587,391, Cl. 200-296.000.

Aitken, Derek, to Applied Materials, Inc. Apparatus for ion implantation. 4,587,432, Cl. 250-492.200.

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Koivula, Caj, 4,586,411, Cl. 83-175.000.

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Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Laminate sheets. 4,587,175, Cl. 428-596.000.

Akao, Takeshi; Nagata, Shuichi; Osaki, Katsumichi; and Okamoto, Yoshiharu, to Kikkoman Corporation. Process for producing liquid seasoning. 4,587,127, Cl. 426-46.000.

Akasu, Masahira, to Mitsubishi Denki Kabushiki Kaisha. Knock suppression apparatus for internal combustion engine. 4,586,474, Cl. 123-425.000.

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Alamo, Jaime: *See—*
Roy, Rustum; and Alamo, Jaime, 4,587,172, Cl. 428-450.000.

Alaniz, Leonore. Garments employing superimposed, diagonally-oriented panels with folded-back end portions. 4,586,198, Cl. 2-105.000.

Alcon Laboratories, Inc.: *See—*
DeSantis, Louis M.; deFaller, Joseph M.; and York, Billie M., Jr., 4,587,257, Cl. 514-392.000.

Alexander, Randall W.; and Troupes, Demetrios, to International Business Machines Corporation. Printer for printing characters in two alternative print qualities. 4,586,835, Cl. 400-121.000.

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All Packaging Machinery & Supplies Corp.: *See—*
Litt, Irving L.; and Torres, Jose, 4,586,318, Cl. 53-459.000.

Alleman, Raymond A.: *See—*
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Allen, Gordon L.; Munro, Robert; and Day, Roger A., to AE PLC. Pistons. 4,586,553, Cl. 164-30.000.

Allied Colloids Limited: *See—*
MacDonald, Alister R. F., 4,587,108, Cl. 423-11.000.

Allied Corporation: *See—*
Rabinkin, Anatol; and Datta, Amitava, 4,587,097, Cl. 420-473.000.

Allington, Robert W., to Isco, Inc. Absorbance monitor. 4,587,463, Cl. 315-307.000.

Alltech Associates, Inc.: *See—*
Anderson, James M., Jr., 4,586,732, Cl. 285-12.000.
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Allweier, Werner K.; and Knight, David W., to U. S. Baird Corporation, The. Digital control spring forming machine. 4,586,357, Cl. 72-137.000.

Alps Electric Co., Ltd.: *See—*
Shimaoka, Motohiro; and Saito, Yukio, 4,587,585, Cl. 360-97.000.

Alsup, James D., Jr.: *See—*
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Altenschopfer, Theodor: *See—*
Kruse, Hans; Witthaus, Martin; Altenschopfer, Theodor; and Schumann, Klaus, 4,587,031, Cl. 252-135.000.

Alter, Richard R., to Continental Plastic Corporation. Culture collection instrument and sealed swab holder therefor. 4,586,604, Cl. 206-210.000.

Alza Corporation: *See—*
Edgren, David; Wong, Patrick S. L.; and Theeuwes, Felix, 4,587,117, Cl. 424-15.000.
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Aman, Robert C., Jr., to Thermo King Corporation. Refrigerant compressor bypass oil filter system. 4,586,875, Cl. 417-228.000.

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Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,587,316, Cl. 526-247.000.

Amano, Yoshiaki: *See—*
Sugiyama, Hiroyuki; Takahashi, Nobuaki; Shibamoto, Takeshi; Sato, Hideo; Amano, Yoshiaki; and Tanaka, Koji, 4,587,558, Cl. 358-160.000.

Amano, Yoshikazu; Arai, Fuminori; and Kitajima, Masao, to Fuji Photo Film Co., Ltd. Multilayer analytical element for the detection of hydrogen peroxide. 4,587,100, Cl. 422-56.000.

Amdahl Corporation: *See—*
Amdahl, Gene M.; and Lee, Hsiao-Peng S., 4,587,611, Cl. 364-200.000.

Amdahl, Gene M.; and Lee, Hsiao-Peng S., to Amdahl Corporation. Multiple module control store for use in a data processing system. 4,587,611, Cl. 364-200.000.

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America, William G., to Perkin-Elmer Corporation, The. Liquid chromatography column assembly. 4,587,014, Cl. 210-198.200.

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Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang I., 4,587,331, Cl. 536-55.000.
Nagaraj, D. R.; and Wang, Samuel S., 4,587,013, Cl. 209-167.000.

American Home Products Corporation: *See—*
Buzby, George C., Jr., 4,587,360, Cl. 564-92.000.
Schiehser, Guy A.; and Strike, Donald P., 4,587,345, Cl. 548-212.000.

American Standard Inc.: *See—*
Worbois, Robert J., 4,586,755, Cl. 303-28.000.

Amko International B.V.: *See—*
Kuipers, Gerardus H. M., 4,586,276, Cl. 38-8.000.

Ammon, J. Preston; Kendall, Jerry A.; and Martens, John D., to Elfab Corp. Method of making a modular connector. 4,586,254, Cl. 29-884.000.

Amoco Corporation: *See—*
Brown, Albert P.; and Hundley, John G., 4,587,355, Cl. 562-414.000.
Kilner, Peter H.; Egan, Joseph P., Jr.; Ceisel, Stephen G.; and Schammel, Wayne P., 4,587,350, Cl. 549-245.000.

AMP Incorporated: *See—*
Bunnell, Edward D., 4,587,596, Cl. 361-398.000.
Cobaugh, Robert F.; Fedder, James L.; and Taylor, Attalee S., 4,586,772, Cl. 339-75.0MP.
Dubbs, Jack F.; and Hanyen, Clyde K., 4,586,607, Cl. 206-329.000.
Grabbe, Dimitry G.; and Downs, Richard C., 4,587,548, Cl. 357-70.000.
Kraemer, Rudolf E.; and Moritz, Werner, 4,586,771, Cl. 339-75.0MP.
Lothmann, Werner; Owen, Leonard J.; and Simmons, Reginald J., 4,586,773, Cl. 339-91.00R.

Ampex Corporation: *See—*
desJardins, Stephen R., 4,587,578, Cl. 360-74.100.
Garrison, Marvin C., 4,587,166, Cl. 428-336.000.

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Sunshine, Abraham; Laska, Eugene M.; and Siegel, Carole E., 4,587,249, Cl. 514-265.000.

Anchor, Michael J., to BASF Corporation. Preparing capped polyoxyalkylene polyols. 4,587,365, Cl. 568-619.000.

Anda, Yasusuke: *See—*
Horada, Osamu; and Anda, Yasusuke, 4,586,471, Cl. 123-399.000.

Anderson, Alan F.; and Easterby, Robert W., to Mainmet Limited. Read and erase device. 4,587,571, Cl. 360-2.000.

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Anderson, Joseph R., to Werner Lehara, Inc. Apparatus for shaping "soft" baking dough and the like by rotary molding apparatus. 4,586,888, Cl. 425-362.000.

Andersson, Olle; and Morner, Bengt L., to AB Volvo. Arrangement in motor vehicles for indicating engine loads. 4,586,472, Cl. 123-401.000.

Andersson, Rolf: *See—*
Josefsson, Claes G.; and Andersson, Rolf, 4,586,648, Cl. 229-114.000.

Ando, Hideo, to Tokyo Shibaura Denki Kabushiki Kaisha. Optical disk. 4,587,648, Cl. 369-275.000.

Ando, Kunio: *See—*
Osawa, Michitaka; Ando, Kunio; and Maekawa, Hitoshi, 4,587,495, Cl. 330-311.000.

Ando, Satoru: *See—*
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Andre, Wolfram K., to Kurt Wolf & Co. KG. Device to control the cooking process in a steam pressure cooker. 4,587,405, Cl. 219-491.000.

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Andres, Lewis B.; Esvang, Robert L.; and Di Lorenzo, Ralph N., to APCO Valve and Primer Corporation. Air release valve. 4,586,528, Cl. 137-202.000.

Andrews, Russell J. Railroad car coupler alignment device. 4,586,620, Cl. 213-15.000.

Andrieu, Louis; and Peyre, Henri, to STE LOOK. Variable-height device for supporting a boot on a ski. 4,586,727, Cl. 280-607.000.

Anhauser, Dieter; Kreitlow, Gerhard; Olbrich, Hubertus; Reinhold, Karl-Heinz; Simon, Gunter; and Gockel, Karl-Heinz, to Lohmann GmbH & Co. KG. Flat laminate part consisting of a substrate layer, a cover layer and an auxiliary pull-off means for the cover layer. 4,587,146, Cl. 428-41.000.

Annegarn, Marcellinus J. J. C.: *See—*
Doornhein, Laurens; Raven, Johannes G.; Welles, Petrus W. G.; Annegarn, Marcellinus J. J. C.; and Nillesen, Antonius H. H. J., 4,587,557, Cl. 358-140.000.

Annen, Klaus; Petzoldt, Karl; Laurent, Henry; Wiechert, Rudolf; and Hofmeister, Helmut, to Schering Aktiengesellschaft. Novel 6α-methylprednisolone derivatives, their preparation, and their use. 4,587,236, Cl. 514-179.000.

Anonychuk, Alexander B.: *See—*
Lane, Christopher C.; Anonychuk, Alexander B.; and Unger, Peter, 4,587,332, Cl. 536-102.000.

Anzai, Katsunori: *See—*
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,095, Cl. 419-13.000.
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,174, Cl. 428-552.000.

AOI Chemical, Inc.: *See—*
Niwa, Hajime; and Hironaka, Katsumi, 4,587,070, Cl. 264-122.000.

Aoki, Hitoshi: *See—*
Toyofuku, Hatsunori; Tsuriya, Yoshihiro; Kuroda, Toshio; Aoki, Hitoshi; and Nagasawa, Hiroshi, 4,587,254, Cl. 514-326.000.

Aoki, Kozo: *See—*
Ono, Michio; Morigaki, Masakazu; Kamio, Takayoshi; Aoki, Kozo; and Furuya, Kazuhiko, 4,587,210, Cl. 430-555.000.

Aoki, Minoru: *See—*
Ohtomo, Seiya; Aoki, Minoru; and Kasai, Yoshio, 4,587,072, Cl. 264-297.800.

Aoki, Seiichi: *See—*
Saito, Akio; Aoki, Seiichi; Inamoto, Tadayoshi; Yokoi, Katsuyuki; and Ikeda, Masami, 4,587,534, Cl. 346-140.00R.

Aoki, Shigeki: *See—*
Matsuura, Sadaji; Arai, Yasuo; Aoki, Shigeki; and Ando, Satoru, 4,586,958, Cl. 106-15.050.

Aono, Akira: *See—*
Isobe, Mitsuo; Sakurai, Takayasu; Sawada, Kazuhiro; Iizuka, Tetsuya; Ohtani, Takayuki; and Aono, Akira, 4,587,638, Cl. 365-200.000.

Aono, Toshiaki: *See—*
Sakaguchi, Yukihiko; Aono, Toshiaki; and Fujita, Shinsaku, 4,587,206, Cl. 430-348.000.

Aoyagi, Yukio: *See—*
Watanabe, Hiroshi; Izumi, Eiki; Aoyagi, Yukio; Honma, Kazuo; and Nakajima, Kichio, 4,586,330, Cl. 60-421.000.

Aoyama, Keizo; Seki, Teruo; and Yamauchi, Takahiko, to Fujitsu Limited. Static semiconductor memory device incorporating redundancy memory cells. 4,587,639, Cl. 365-200.000.

Aoyama, Motoo: *See—*
Takeda, Renzo; Miki, Kazuyoshi; Ohga, Yukiharu; Fuse, Motomasa; Hiramoto, Kazuo; and Aoyama, Motoo, 4,587,089, Cl. 376-428.000.

APCO Valve and Primer Corporation: *See—*
Andres, Lewis B.; Esvang, Robert L.; and Di Lorenzo, Ralph N., 4,586,528, Cl. 137-202.000.

Apisdorf, Yair, to Ardac, Inc. Magnetic sensor for tray acceptor. 4,587,412, Cl. 235-449.000.

Applied Materials, Inc.: *See—*
Aitken, Derek, 4,587,432, Cl. 250-492.200.
Edwards, Alan T.; and Smith, Steven A., 4,586,743, Cl. 294-86.400.

Aprica Kassai Kabushikikaisha: *See—*
Kassai, Kenzou, 4,586,399, Cl. 74-551.300.

Arahari, Kouichi: *See—*
Matsubara, Tetsuyuki; Ito, Norifumi; Ichikawa, Kouzo; Arahari, Kouichi; and Maeda, Tetsuo, 4,587,294, Cl. 525-53.000.

Arai, Fuminori: *See—*
Amano, Yoshikazu; Arai, Fuminori; and Kitajima, Masao, 4,587,100, Cl. 422-56.000.

Arai, Yasuo: *See—*
Matsuura, Sadaji; Arai, Yasuo; Aoki, Shigeki; and Ando, Satoru, 4,586,958, Cl. 106-15.050.

Arai, Yoji: *See—*
Murayama, Seiichi; Yasuda, Makoto; Miyashita, Tsune; Arai, Yoji; Kawasumi, Kenichi; and Kinoshita, Kazunori, 4,587,460, Cl. 315-174.000.

Arakawa, Jun: *See—*
Tsuda, Momotoshi; and Arakawa, Jun, 4,587,207, Cl. 430-389.000.

Arakawa Kagaku Kogyo Kabushiki Kaisha: *See*—
Makita, Muneharu; and Tanioku, Shozo, 4,587,308, Cl. 525-373.000.
Araki, Shigeru: *See*—
Tsurubuchi, Tetsuo; Sekiguchi, Toru; and Araki, Shigeru, 4,587,574, Cl. 360-14.300.
Arch, Alfred J.: *See*—
Drake, Cyril F.; and Arch, Alfred J., 4,587,267, Cl. 514-769.000.
Archer, Gary D.; and Greenberg, Herm J., to International Business Machines Corporation. Method and apparatus for dynamic invocation of utilities. 4,587,628, Cl. 364-900.000.
Ardac, Inc.: *See*—
Apisdorf, Yair, 4,587,412, Cl. 235-449.000.
Area Lighting Research, Inc.: *See*—
Duve, George; Waage, Harold; and Quick, Luther P., 4,587,417, Cl. 250-214.0AL.
Argoud, Maurice J.; Walker, Walter L.; and Butler, Lloyd V., to United States of America, National Aeronautics and Space Administration. Protective telescoping shield for solar concentrator. 4,586,487, Cl. 126-418.000.
Arika, Junji; Aimoto, Michiyuki; and Miyazaki, Hiroshi, to Toyo Soda Manufacturing Co., Ltd. Process for preparation of high-silica faujasite type zeolite. 4,587,115, Cl. 423-329.000.
Arima, Hideo: *See*—
Tosaki, Hiromi; Mozume, Teruo; Arima, Hideo; and Ikegami, Akira, 4,587,040, Cl. 252-519.000.
Arioka, Hiroyuki: *See*—
Nishimatsu, Masaharu; Ide, Toshiaki; Arioka, Hiroyuki; and Kubota, Yuichi, 4,587,150, Cl. 428-141.000.
Arlauskas, Alfonsas, to General Motors Corporation. Vehicle body door lock. 4,586,737, Cl. 292-216.000.
Arnold, John D., to Brighton Pharmaceutical, Inc. Hydrocodone/ibuprofen pharmaceutical compositions and method. 4,587,252, Cl. 514-282.000.
Arnould, Jean C.; Evans, John R.; Jones, Geraint; and Thomson, David S., to Imperial Chemical Industries PLC. Halogenophenyl glyceride esters for use in the prophylaxis and/or therapy of acne vulgaris. 4,587,262, Cl. 514-548.000.
Arques, Marc: *See*—
Munier, Bernard; and Arques, Marc, 4,587,426, Cl. 250-338.000.
Arrington, Stephen T.: *See*—
Bradley, Gary W.; and Arrington, Stephen T., 4,586,961, Cl. 134-2.000.
Asahi Breweries Ltd.: *See*—
Taguchi, Kazuo; and Okawa, Yogiro, 4,586,458, Cl. 118-72.000.
Asahi Glass Company, Ltd.: *See*—
Miyake, Haruhisa; Ito, Hiroaki; Suzuki, Koji; and Yamada Ryoji, 4,586,992, Cl. 204-98.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Fukuoka, Shinsuke; and Watanabe, Tomonari, 4,587,056, Cl. 260-453.0PC.
Miki, Kosuke; and Hiruta, Shiro, 4,586,437, Cl. 102-220.000.
Nakamura, Shohei; and Tuji, Yoshimasa, 4,587,186, Cl. 430-14.000.
Asano, Junichi, to Canon Kabushiki Kaisha. Recording apparatus producing multiple copies simultaneously. 4,587,532, Cl. 346-134.000.
Asano, Kozo: *See*—
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,587,316, Cl. 526-247.000.
Asano, Seiji: *See*—
Nishizawa, Tetuo; Asano, Seiji; Ishiguro, Minoru; Komori, Masanoshin; Tobioka, Takashi; Yoshida, Toshio; and Hara, Hiroshi, 4,586,801, Cl. 354-173.100.
Asano, Toshio: *See*—
Murai, Toshiaki; Kawana, Takeshi; and Asano, Toshio, 4,586,247, Cl. 29-705.000.
Asayama, Yoshiaki; and Kominami, Seiya, to Mitsubishi Denki Kabushiki Kaisha. Air-to-fuel ratio detector for engines. 4,586,476, Cl. 123-440.000.
Associated Enterprises, Inc.: *See*—
Ollis, Frederick R.; and Tengler, John N., 4,586,776, Cl. 339-105.000.
Astle, Brian, to RCA Corporation. Cursor controlled page selection in a video display. 4,587,520, Cl. 340-712.000.
AT&T Bell Laboratories: *See*—
Berthold, Joseph E.; Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., 4,587,545, Cl. 357-38.000.
Ditzel, David R., 4,587,632, Cl. 364-900.000.
Fegley, Charles R., 4,586,608, Cl. 206-334.000.
Harrison, Marc L., 4,586,242, Cl. 29-574.000.
Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., 4,587,656, Cl. 357-38.000.
Levinson, Stephen E.; Rabiner, Lawrence R.; and Sondhi, Man M., 4,587,670, Cl. 381-43.000.
AT&T Technologies, Inc.: *See*—
Engstrom, John G.; and Till, Robert A., Jr., 4,587,517, Cl. 340-542.000.
Atelier de Construction Steiger S.A.: *See*—
Morard, Michel; and Baseggio, Marcello, 4,586,352, Cl. 66-64.00R.
Atkins, Randall K.; and Weigel, Leland O., to Eli Lilly and Company. Synthesis of ketones with calcium hypochlorite. 4,587,351, Cl. 549-333.000.
Atlantic Richfield Company: *See*—
Warfel, David R.; and Nicholson, Harold L., 4,587,330, Cl. 528-490.000.
Atlas Copco Aktiebolag: *See*—
Berger, Karl G.; and Karden, Karl G., 4,586,884, Cl. 418-43.000.
Atlas Pacific Engineering Company: *See*—
Tichy, Oldrich J.; and Meissner, Konrad E., 4,586,430, Cl. 100-118.000.
Auerbach, Victor: *See*—
Chen, Thomas Y.; Clemens, Jon K.; and Auerbach, Victor, 4,587,570, Cl. 358-342.000.
August Sauter GmbH: *See*—
Muerdter, Herbert; Hermann, Bernhard; and Pfister, Johann, 4,586,575, Cl. 177-124.000.
Auman, John T.; Luyckx, Robert R.; Singh, Harmahendar; and Stockton, Thomas W., to General Motors Corporation. Truck brake control system. 4,586,584, Cl. 180-271.000.
Aur Hydropower Limited: *See*—
Reid, Alister U., 4,586,333, Cl. 60-506.000.
Ausnit, Steven, to Minigrip, Inc. Method of and means for easy opening bags. 4,586,319, Cl. 53-468.000.
Avakian, Roger W.; and Jodice, Ronald E., to General Electric Company. Foamable polycarbonate compositions, articles and methods. 4,587,272, Cl. 521-86.000.
Avallone, William J.: *See*—
Smith, Noel A.; and Avallone, William J., 4,586,963, Cl. 148-6.15R.
Avco Corporation: *See*—
Faticanti, Robert L., 4,586,252, Cl. 29-762.000.
Avella, Frank S., to Plan Hold Corporation. Controlled mounting for luminaire on tiltable drafting board. 4,586,440, Cl. 108-23.000.
Averkiev, Leonid A.: *See*—
Dubrovsky, Evgeny V.; Averkiev, Leonid A.; and Martynova, Natalya I., 4,586,563, Cl. 165-151.000.
AVL AG: *See*—
Marsoner, Hermann; and Kroneis, Herbert, 4,587,101, Cl. 422-56.000.
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Shiokawa, Kozo; Morishima, Norihisa; and Goto, Toshio, to Nihon Tokushu Noyaku Seizo K.K. Herbicidally active substituted phenylsulfonylurea derivatives. 4,586,951, Cl. 71-92.000.
Ayla, Cihan; Dietrichs, Hans-Hermann, deceased (by Dietrichs, Magda M. U., Daniel Dietrichs, Stephan Dietrichs, heirs); Puls, Jurgen; and Sinner, Michael, to Fritz-Werner Industrie-Ausruestungen GmbH. Aqueous heat-curable compositions, and their use. 4,587,285, Cl. 524-78.000.
Azekura, Kazuo; Kawashima, Katsuyuki; Inoue, Kotaro; and Uchikawa, Sadao, to Hitachi, Ltd. Initial charge core of fast breeder and method of charging the core with fuel. 4,587,078, Cl. 376-267.000.
Azizian, Farid: *See*—
Shanton, Kenneth J.; and Azizian, Farid, 4,587,538, Cl. 346-218.000.
Azumakawa, Tadashi: *See*—
Takano, Satoshi; and Azumakawa, Tadashi, 4,586,976, Cl. 156-233.000.
Bachmann, Herbert; and Schwyter, Anton, to Stopinc Aktiengesellschaft. Refractory plate assembly for use in sliding closure unit. 4,586,699, Cl. 266-287.000.
Back, Jack F. Door hinge duplicating template. 4,586,262, Cl. 33-197.000.
Backman, Erik E.; Henrekson, Ulf A.; and Nertman, Inge L., to Aktiebolaget Volvo. Method and apparatus for forming packs of articles. 4,586,316, Cl. 53-449.000.
Baehring, Manfred, to Siemens Aktiengesellschaft. Input signal level converter for an MOS digital circuit. 4,587,447, Cl. 307-482.000.
Baker, Charles L.: *See*—
Blaser, Don E.; Chang, Bong H.; and Baker, Charles L., 4,587,010, Cl. 208-127.000.
Baker Oil Tools, Inc.: *See*—
Jameson, Robert C., 4,586,567, Cl. 166-121.000.
Baker, Terence S., to Boots-Celltech Diagnostics Limited. Immunoassay. 4,587,212, Cl. 435-7.000.
Bakewicz, Frank J.: *See*—
Butler, Gary M.; and Bakewicz, Frank J., 4,586,738, Cl. 293-107.000.
Bala, John L.; McCarron, Michael; and Zapolin, Richard E., to Electronics Corporation of America. Microcomputer driven fail-safe device with short circuit detection for electronic control circuitry. 4,587,590, Cl. 361-94.000.
Baldwin, Gary L.: *See*—
Hornak, Thomas; Baldwin, Gary L.; and Potter, Ronald W., 4,587,477, Cl. 323-312.000.
Balinski, Henry A., to United States Gypsum Company. Clip for use with runner and area separation wall structure utilizing clip. 4,586,305, Cl. 52-241.000.
Ball, Kevin D.; and Davies, Peter, to Coated Electrodes Limited. Apparatus for sealing electrodes in electric arc furnaces. 4,587,658, Cl. 373-95.000.
Balland, Francois. Mobile binding. 4,587,151, Cl. 428-156.000.
Ballantyne, David B.: *See*—
Lee, David N.; and Ballantyne, David B., 4,586,355, Cl. 70-455.000.
Balzano, Lucien D.: *See*—
Lepretre, Marc V. A.; Balzano, Lucien D.; and Caillault, Michel R., 4,586,873, Cl. 417-54.000.
Ban, Thomas E. Safety cover for an electrical outlet. 4,586,765, Cl. 339-44.00R.
Bandura, Vitaly; and Sooy, Robert J., to USM Corporation. Drive mechanism for a cut and clinch unit. 4,586,237, Cl. 29-566.300.
Bangor Punta Corporation: *See*—
Sniezak, Gary, 4,586,282, Cl. 42-71.00P.

Banno, Taiichi, to Olympus Optical Co., Ltd. Method and apparatus for correcting a curve relating an absorbance to a concentration. 4,587,624, Cl. 364-571.000.

Barabas, Eugene S., to GAF Corporation. Surface cleaning process. 4,586,962, Cl. 134-4.000.

Barchas, Jack D.; Weber, Eckard; Evans, Christopher J.; Wei, E. T.; Chang, J. K.; Fuchs, Ingbert; and Mues, Gabriele, to Leland Stanford Junior University, Board of Trustees of the. Use of Arg-Phe-amide derivatives. 4,587,233, Cl. 514-15.000.

Bardong, Helmut: *See*—
Kern, Josef; Bardong, Helmut; Humpolik, Bohumil; and Staffa, Karl-Heinz, 4,586,566, Cl. 165-173.000.

Baril, Jacques; and Chailleux, Georges, to Cegedur Societe de Transformation de l'Aluminium Pechiney. Angled assembly of profiles for tongue and groove fitting and key locking. 4,586,310, Cl. 52-766.000.

Barker, John C.; and Cruttwell, Ian A., to Cambridge Instruments Limited. Image inspection system for defect detection. 4,587,617, Cl. 364-507.000.

Barmac Associates Limited: *See*—
Bartley, Bryan A., 4,586,663, Cl. 241-197.000.

Barnes, Bruce E.; Dupin, William W.; and Kuhlemann, Bruce W., to Miles Laboratories, Inc. Pivoting frangible valve for plastic bags. 4,586,928, Cl. 604-408.000.

Barnes, Robert P.: *See*—
Myers, Thomas A.; and Barnes, Robert P., 4,586,572, Cl. 175-85.000.

Barrell, David; Kennedy, Donald E.; and Rollen, Donald C. Copper-clad polyester-epoxy-glass fiber laminates using zinc-coated copper. 4,587,161, Cl. 428-288.000.

Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., to Caterpillar Tractor Co. Heat recovery system including a dual pressure turbine. 4,586,338, Cl. 60-618.000.

Bartha, Ferenc: *See*—
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.

Barthelmes, Norbert; and Woelfel, Werner, to Siemens Aktiengesellschaft. Handle assembly for an x-ray examination apparatus. 4,587,471, Cl. 318-628.000.

Bartley, Bryan A., to Barmac Associates Limited. Tip assembly for rotary mineral breakers. 4,586,663, Cl. 241-197.000.

Baseggio, Marcello: *See*—
Morard, Michel; and Baseggio, Marcello, 4,586,352, Cl. 66-64.00R.

BASF Aktiengesellschaft: *See*—
Bronstert, Klaus; Hochstein, Waldhelm; Vogel, Hans-Henning; and Rath, Hans P., 4,587,307, Cl. 525-362.000.
Dotzauer, Bernhard; Kast, Hans; Franzmann, Gernot; Ley, Gregor; Beckerle, Wilhelm F.; and Schilder, Wolfgang, 4,587,278, Cl. 523-200.000.
Frank, Gerhard; and Neubauer, Gerald, 4,587,228, Cl. 502-185.000.
Hartig, Jurgen; Schuch, Gunter; Stoessel, Armin; Herrmann, Guenter; Brunner, Arthur; Zehner, Peter; and Grosskinsky, Otto-Alfred, 4,587,363, Cl. 568-357.000.
Munstedt, Helmut; Gebhard, Helmut; Naarmann, Herbert; and Schlag, Johannes, 4,587,037, Cl. 252-500.000.
Schneider, Heinz-Walter; Kummer, Rudolf; Leman, Otto; and Panitz, Paul, 4,586,987, Cl. 203-32.000.

BASF Corporation: *See*—
Anchor, Michael J., 4,587,365, Cl. 568-619.000.

Batina, William P.; and Gipson, Lamar H., to Cordis Corporation. Implant communication system with patient coil. 4,586,508, Cl. 128-419.0PG.

Battenfeld Extrusionstechnik GmbH: *See*—
Schafer, Heinrich, 4,586,402, Cl. 74-801.000.

Batterman, Eric P., to RCA Corporation. Signal transition detection circuit. 4,587,448, Cl. 307-517.000.

Battles, Brett E., to Cadre Corporation, The. Method of removing slag from oxygen fuel burner. 4,586,895, Cl. 432-2.000.

Bauer, Denise; Komornicki, Jacques; and Tellier, Jacques, to Societe Nationale Elf Aquitaine. Liquid-liquid extraction with the aid of microemulsions of substances dissolved in water. 4,587,106, Cl. 423-8.000.

Bauer, Herbert; Waibel, Hans; and Speisebecher, Joachim, to USM Corporation. Moisture proof container for moisture curable compositions and apparatus for dispensing moisture curable compositions from a moisture proof container. 4,586,636, Cl. 222-146.500.

Bauer, Hermann: *See*—
Spielmann, Norbert; Gussbacher, Udo; Walther, Wolfgang; and Bauer, Hermann, 4,586,580, Cl. 180-89.100.

Baumberg, Iosif. Gas-plug type valve. 4,586,527, Cl. 137-139.000.

Bausch & Lomb Incorporated: *See*—
Welker, Helmut, 4,586,760, Cl. 312-245.000.

Baxter, Larry K.; and Buehler, Robert J., to L. S. Starrett Company, The. Capacitive displacement measuring instrument. 4,586,260, Cl. 33-125.00C.

Baxter Travenol Laboratories, Inc.: *See*—
King, Martin J., 4,587,518, Cl. 340-603.000.
Tseng, Charles C., 4,586,882, Cl. 417-477.000.

Bayer Aktiengesellschaft: *See*—
Buysch, Hans-Josef; Klipper, Reinhold; Lange, Peter M.; and Mues, Peter, 4,587,347, Cl. 548-317.000.
Knofel, Hartmut; and Brockelt, Michael, 4,587,058, Cl. 560-347.000.
Kopp, Richard; Meyborg, Holger; Grogler, Gerhard; and Schwindt, Jurgen, 4,587,275, Cl. 521-163.000.
Rasshofer, Werner; and Paul, Reiner, 4,587,322, Cl. 528-60.000.
Regel, Erik; Buchel, Karl H.; Reinecke, Paul; and Brandes, Wilhelm, 4,587,239, Cl. 514-184.000.

Bayer, Helmuth. Building system of interconnected block elements. 4,586,299, Cl. 52-79.700.

BBC Brown, Boveri & Co., Ltd.: *See*—
Horler, Hansulrich, 4,586,336, Cl. 60-602.000.
Marek, Alois, 4,587,589, Cl. 361-56.000.

Beam, Thomas E. Lottery selection device. 4,586,710, Cl. 273-138.00A.

Beaudet, William R., to Mead Corporation, The. Fluid jet print head having resonant cavity. 4,587,528, Cl. 346-75.000.

Beaupere, Rene , to Beaupere S.a.r.l., Z.I. des Granges. Universal dimensional gauge table for inner and outer measures. 4,586,261, Cl. 33-147.00E.

Beaupere S.a.r.l., Z.I. des Granges: *See*—
Beaupere, Rene , 4,586,261, Cl. 33-147.00E.

Becherer, Walter; Geyken, Erwin; Jelinek, Nikolaus; Lechner, Franz; and Schausberger, Helmut, to Agfa-Gevaert Aktiengesellschaft. Apparatus for removing strips of photosensitive material from flat envelopes. 4,586,311, Cl. 53-381.00R.

Beck, Jeffrey L.: *See*—
Oda, Ronald L.; Beck, Jeffrey L.; Blubaugh, Robert M.; Harris, Gary R.; Shaw, Ricky L.; and Evans, Michael P., 4,586,852, Cl. 406-14.000.
Sweeney, William T.; and Beck, Jeffrey L., 4,586,853, Cl. 406-14.000.

Becker, Lawrence F., Jr.: *See*—
Murray, Alexander P.; Weisberg, Sharon L.; and Becker, Lawrence F., Jr., 4,587,043, Cl. 252-626.000.

Beckerle, Wilhelm F.: *See*—
Dotzauer, Bernhard; Kast, Hans; Franzmann, Gernot; Ley, Gregor; Beckerle, Wilhelm F.; and Schilder, Wolfgang, 4,587,278, Cl. 523-200.000.

Bedekovic, Davor; and Fletcher, Ian J., to Ciba-Geigy Corporation. Chromogenic 3,3-bisindolyl-4-azaphthalides. 4,587,343, Cl. 546-116.000.

Bedekovic, Davor; and Fletcher, Ian J., to Ciba-Geigy Corporation. Chromogenic dihydrofuropyridinones. 4,587,539, Cl. 346-220.000.

Bedford Engineering Co.: *See*—
Bradley, William P., 4,586,651, Cl. 229-68.00R.

Bedi, James J.; Golden, Donald M.; and Transue, James A., to Ethicon, Inc. Surgical instrument actuator with non-collinear hydraulic pistons. 4,586,502, Cl. 128-334.00R.

Beghin-Say S.A.: *See*—
Tournier, Herve, 4,587,319, Cl. 527-313.000.

Behrend, Ekkehard: *See*—
Gleichenhagen, Peter; Behrend, Ekkehard; and Jauchen, Peter, 4,587,152, Cl. 428-195.000.

Beiersdorf AG: *See*—
Gleichenhagen, Peter; Behrend, Ekkehard; and Jauchen, Peter, 4,587,152, Cl. 428-195.000.

Belanger, Donald J.: *See*—
Henry, Emile J.; and Belanger, Donald J., 4,586,275, Cl. 37-227.000.

Belanger, Inc.: *See*—
Belanger, James A., 4,586,831, Cl. 384-297.000.

Belanger, James A., to Belanger, Inc. Plastic bearing. 4,586,831, Cl. 384-297.000.

Belart, Juan, to ITT Industries, Inc. Pressure-fluid-operable vehicle brake system. 4,586,591, Cl. 188-358.000.

Belef, William M.: *See*—
Tanaka, John S.; and Belef, William M., 4,586,901, Cl. 433-164.000.

Bell, John L., to Burroughs Corporation. Method of simultaneously transmitting isochronous and nonisochronous data on a local area network. 4,587,650, Cl. 370-86.000.

Beloit Corporation: *See*—
Goldenberg, Philip H.; Neuf, George J.; and Kirchner, Edward C., 4,586,662, Cl. 241-102.000.

Ben Clements & Sons, Inc.: *See*—
Won, Yong K., 4,586,609, Cl. 206-343.000.

Benajam, Alain C. A.; and Lachenal, Jean-Michel, to Le Materiel Biomedical. Device for actuating an automatic device comprising a plurality of combined mobile members. 4,587,103, Cl. 422-67.000.

Bendell, Sidney L.; and Michaelis, Theodore D., to RCA Corporation. Cooler control for a solid-state imager camera. 4,587,563, Cl. 358-213.000.

Benjamin, Roy J.; Pearce, David W.; and Powell, Anthony W., to Marconi Avionics Limited. Inductive coupler systems. 4,586,767, Cl. 339-45.00R.

Benko, Pal: *See*—
Budai, Zoltan; Benko, Pal; Ratz nee Simonek, Ildiko ; Rakoczy nee Pinter, Eva; Magyar, Karoly; Kelemen, Jozsef; and Mandi, Attila, 4,587,261, Cl. 514-542.000.

Bennet, Richard G.: *See*—
Patton, James C.; Bennet, Richard G.; Kasper, Dean J.; and Wisakowsky, Eugene E., 4,587,126, Cl. 426-19.000.

Bennett, Allyn N., to Du Pont de Nemours, E. I., and Company. Controlled roughening of a photosensitive composition. 4,587,199, Cl. 430-260.000.

Bensley, Douglas W. Method of making footwear. 4,586,209, Cl. 12-142.00D.

Benvenuto, Enzo. Pallet stripper apparatus. 4,586,235, Cl. 29-564.300.

Berdahl, Paul H., to United States of America, Energy. Selective radiative cooling with MgO and/or LiF layers. 4,586,350, Cl. 62-467.000.

Berecz, Imre. Nut driver. 4,586,405, Cl. 81-57.370.

Berfield, Robert C., to Shop Vac Corporation. Compact vacuum cleaner. 4,586,214, Cl. 15-327.00C.

Berg, Thomas E.; and Pollard, Christopher A., to Magnetic Peripherals. Two axis linear motor for optical focusing and tracking system in optical recording. 4,587,466, Cl. 318-38.000.

Berger, James R., to National Machinery Company, The. Quick-change transfer head. 4,586,364, Cl. 72-405.000.

Berger, Karl G.; and Karden, Karl G., to Atlas Copco Aktiebolag. Pneumatic power tool with speed governor. 4,586,884, Cl. 418-43.000.

Berger, Meinhard. Device for measuring the position and/or motion of a body part. 4,586,515, Cl. 128-782.000.

Bergmann, Arthur: *See*—
Potter, George M.; Bergmann, Arthur; and Haidlen, Ulrich, 4,587,110, Cl. 423-30.000.

Berkowitz, Barry J.: *See*—
Franco, Robert J.; Berkowitz, Barry J.; and Kaul, Bal K., 4,586,561, Cl. 165-1.000.

Berkowitz, Norbert, to Meridian Petroleums Ltd.; and Berkowitz, Norbert, a part interest. Method of preparing coal to increase its calorific value and making it safe for storage and transport. 4,586,935, Cl. 44-1.00R.

Berktold, Robert E.: *See*—
Sisson, George A.; Berktold, Robert E.; and Lynch, Henry W., 4,586,505, Cl. 128-344.000.

Bernard, Bernard, to Societe Anonyme: Leisystem. Safety device for fastening the head of a sail to a masthead. 4,586,450, Cl. 114-108.000.

Bernhardt, Rainer: *See*—
Bockemuhl-Simon, Johannes J.; Bernhardt, Rainer; and Kremer, Walter, 4,586,805, Cl. 354-323.000.

Berseniev, Vladimir A.: *See*—
Golubev, Evgeny K.; Lensky, Alexandr R.; Glazov, Evgeny E.; Berseniev, Vladimir A.; Vakulenko, Boris F.; Mikhailov, Vasily S.; and Shiryaev, Anatoly A., 4,586,981, Cl. 159-47.100.

Berson, Daniel. Method of applying a local anesthetic agent to a wound. 4,586,921, Cl. 604-49.000.

Berta, Dominic A., to Hercules Incorporated. Butyl rubber and chlorinated rubber composition. 4,587,302, Cl. 525-237.000.

Berthold, Joseph E.; Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., to AT&T Bell Laboratories. High voltage dielectrically isolated remote gate solid-state switch. 4,587,545, Cl. 357-38.000.

BERTIN & Cie: *See*—
Lepretre, Marc V. A.; Balzano, Lucien D.; and Caillault, Michel R., 4,586,873, Cl. 417-54.000.

Beshore, Craig S. Machine having integral piston and cylinder wall sections. 4,586,881, Cl. 417-460.000.

Bessedine, Anatole, to Commissariat a l'Energie Atomique. Safety actuator release device. 4,587,077, Cl. 376-215.000.

Bessho, Yoshihiko: *See*—
Miyauchi, Yoshio; Takenaka, Kiyosi; and Bessho, Yoshihiko, 4,586,809, Cl. 355-10.000.

Betriebsforschungsinstitut VDEh Institut fur angewandte Forschung GmbH: *See*—
Bohlander, Peter, 4,587,414, Cl. 250-202.000.

Beylerian, George. Magnetic covered folio case. 4,586,729, Cl. 281-5.000.

Bhattacharya, Apurba, to Merck & Co., Inc. Preparation of enantiomers of a substituted fluorenyloxyacetic acid. 4,587,357, Cl. 562-461.000.

Bichlmayer, Klaus: *See*—
Klauser, Rainer; Meinetsberger, Eike; and Bichlmayer, Klaus, 4,587,250, Cl. 514-278.000.

Bierleutgeb, Fritz; and Kappl, Gerhard, to C. Reichert Optische Werke, AG. Microscope with an objective turret. 4,586,794, Cl. 350-520.000.

Biermans, Martinus B. G. M.: *See*—
Everhardus, Roelof H.; Siebers, Theodorus J. H.; and Biermans, Martinus B. G. M., 4,587,193, Cl. 430-126.000.

Big Four Equipment, Inc.: *See*—
Collins, Curran N., 4,586,551, Cl. 157-1.240.

Bigham, Eric C.: *See*—
Nichol, Charles A.; Reinhard, John F., Jr.; Smith, Gary K.; and Bigham, Eric C., 4,587,340, Cl. 544-258.000.

Bilodeau, Francois: *See*—
Tremblay, Yves; Kawasaki, Brian S.; and Bilodeau, Francois, 4,586,784, Cl. 350-96.150.

Bilson, Edward B.: *See*—
Dean, John R.; and Bilson, Edward B., 4,587,602, Cl. 362-375.000.

Binder, Arnold. Method and apparatus for the diagnosis of tissue samples. 4,587,428, Cl. 250-372.000.

Binder, Perry S. Hydrogel keratoprosthesis. 4,586,929, Cl. 623-5.000.

Biotronics Instruments: *See*—
Schlager, Kenneth J.; and Melvin, Jeffrey R., 4,586,514, Cl. 128-773.000.

Bird, John M.: *See*—
Brown, Ian J.; Bird, John M.; McDougall, Ian L.; and Black, David, 4,587,504, Cl. 335-216.000.

Birring, Mats G., to Molnlycke AB. Elastic pants. 4,586,199, Cl. 2-401.000.

Bitha, Panayota: *See*—
Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang L., 4,587,331, Cl. 536-55.000.

Bittler, Dieter; Laurent, Henry; Nickisch, Klaus; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Novel androstane derivatives, process for their production, and pharmaceutical preparations containing them. 4,587,235, Cl. 514-178.000.

BIW Cable Systems, Inc.: *See*—
Didier, Robert G., 4,586,774, Cl. 339-94.00M.

Blach, Josef A.; and Fritsch, Rudolf P. Torque-splitting pinion gear for twin-screw machines. 4,586,219, Cl. 74-410.000.

Black, David: *See*—
Brown, Ian J.; Bird, John M.; McDougall, Ian L.; and Black, David, 4,587,504, Cl. 335-216.000.

Black & Decker, Inc.: *See*—
Yacobi, Michael S., 4,587,384, Cl. 200-1.00V.

Blackstone, Scott C.; Jastrzebski, Lubomir L.; and Corboy, John F., Jr., to RCA Corporation. Vertical IGFET with internal gate and method for making same. 4,586,240, Cl. 29-571.000.

Blair, Roy D. Athletic shoe cleats for artificial turf. 4,586,274, Cl. 36-59.00R.

Blake, Frederick H. Light-sensing, light fixture control system. 4,587,459, Cl. 315-158.000.

Blalock, Paul B.; and Schwartz, William C., to Burlington Industries, Inc. Process and apparatus for coloring textile yarns. 4,586,934, Cl. 8-483.000.

Blaser, Don E.; Chang, Bong H.; and Baker, Charles L., to Exxon Research and Engineering Co. Fluid coking with improved stripping. 4,587,010, Cl. 208-127.000.

Bleasdale, William W.; and Boultbee, Frank E., to Okanagan Turbo Sprayers Ltd. Vehicle-borne apparatus for spraying around immovable objects. 4,586,287, Cl. 47-1.700.

Block Business Forms, Inc.: *See*—
McAnelly, Jan A., 4,586,703, Cl. 270-39.000.

Block, Harvey P., to U.S. Highway Products, Inc. Sign making machine. 4,586,413, Cl. 83-522.000.

Block, Harvey P., to U.S. Highway Products, Inc. Sign making machine. 4,586,414, Cl. 83-522.000.

Bloechlinger, Oskar, to H. Bloechlinger AG. Track shoe for treaded vehicles. 4,586,757, Cl. 305-35.00R.

Blohm & Voss AG: *See*—
Schlichthorst, Norbert, 4,586,908, Cl. 440-89.000.

Blom, Eric D.; Singer, Mark I.; and Harkleroad, Barry A., to Hansa Medical Products, Inc. Auto actuatable switch, speech simulator and method for tracheotomized individuals. 4,586,931, Cl. 623-9.000.

Blomback, Birger; and Okada, Masahisa, to New York Blood Center, Inc. Fibrin gel. 4,587,018, Cl. 210-484.000.

Blomquist, George W. Electronic pressure gauge and flow meter. 4,586,383, Cl. 73-706.000.

Blouin, Glenn M., to Tennessee Valley Authority. Production of high-strength, storage-stable particulate urea. 4,587,358, Cl. 564-3.000.

Blubaugh, Robert M.: *See*—
Oda, Ronald L.; Beck, Jeffrey L.; Blubaugh, Robert M.; Harris, Gary R.; Shaw, Ricky L.; and Evans, Michael P., 4,586,852, Cl. 406-14.000.

Blum, Albert. Aeration apparatus for large waters. 4,587,064, Cl. 261-37.000.

BMC Industries, Inc.: *See*—
Walter, Leo; Ring, Charles E.; Seppala, Bryan R.; Kennelly, Patric M.; and Marnie, James P., 4,586,778, Cl. 339-221.00R.

Board of Governors for Higher Education, State of Rhode Island: *See*—
Yang, Sze C.; and Durand, Richard R., Jr., 4,586,792, Cl. 350-357.000.

Bochumer Eisenhutte Heintzmann GmbH & Co. KG: *See*—
Heintzmann, Peter; Koppers, Manfred; Bohnes, Karlheinz; and Smektala, Rolf-Peter, 4,586,530, Cl. 137-322.000.
Nerlich, Ernst-Gunter, 4,586,424, Cl. 91-6.000.

Bock, Immo E., to Johannesburg Construction Corporation (PTY) Ltd. Electric detonator. 4,586,435, Cl. 102-202.500.

Bockemuhl-Simon, Johannes J.; Bernhardt, Rainer; and Kremer, Walter, to JOBO Labortechnik GmbH & Co. KG. Device for developing of photo material. 4,586,805, Cl. 354-323.000.

Bodor, Janos; Van Bodegom, Bertus M.; Poot, Cornelis; and Reckweg, Freek, to Lever Brothers Company. Edible water-in-oil emulsion spreads containing discrete granules or agglomerates of granules of crystalline starch. 4,587,131, Cl. 426-603.000.

Boehringer Mannheim GmbH: *See*—
Rothe, Anselm; Selle, Adolf K.; and Sojka, Bernward, 4,587,099, Cl. 422-56.000.

Boeing Company, The: *See*—
Cushman, Glen P., 4,587,476, Cl. 323-276.000.
Rasmussen, Glen L., 4,586,989, Cl. 204-15.000.

Bohlander, Peter, to Betriebsforschungsinstitut VDEh Institut fur angewandte Forschung GmbH. Apparatus for adjusting the position of an edge with surface portions reflecting different wavelengths of light. 4,587,414, Cl. 250-202.000.

Bohn, Gerhard: *See*—
Steinmetz, Gunter; and Bohn, Gerhard, 4,587,472, Cl. 318-687.000.

Bohnes, Karlheinz: *See*—
Heintzmann, Peter; Koppers, Manfred; Bohnes, Karlheinz; and Smektala, Rolf-Peter, 4,586,530, Cl. 137-322.000.

Boitiaux, Jean-Paul: *See*—
Cosyns, Jean; and Boitiaux, Jean-Paul, 4,587,369, Cl. 585-259.000.

Bok, Edward. Apparatus for floating transport and processing of substrate or tape. 4,587,002, Cl. 204-298.000.

Bolcskei, Hedvig: *See*—
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.

Bolmstedt, Ulf: *See*—
Hailstrom, Bengt; Olsson, Olle; Bolmstedt, Ulf; and Johansson, Bjorn-Olow, 4,586,565, Cl. 165-167.000.

Bonazoli, Robert P.; and Ragland, Owtis J., Jr., to GTE Products Corporation. Incandescent lamp with improved press seal. 4,587,454, Cl. 313-331.000.

Bondico, Inc.: *See*—
Shaw, Mark D., 4,586,624, Cl. 220-67.000.

Bonhomme, Nicolaas, to Framatome & Cie. Sealing device for the drive shaft of a high pressure fluid pump. 4,587,076, Cl. 376-203.000.

Bonne, Ulrich; and Johnson, Robert G., to Honeywell Inc. Integratable oxygen sensor. 4,587,105, Cl. 422-98.000.

Bonnerot, Georges; and Daout, Michel, to Telecummunications Radioelectriques et Telephoniques T.R.T. Circuit for recovering the carrier of an amplitude-and-phase-modulated input signal. 4,587,498, Cl. 329-122.000.

Booher, Howard. Beam fabricating device. 4,586,646, Cl. 228-44.300.

Booher, Richard N.; and Kornfeld, Edmund C., to Eli Lilly and Company. Partially hydrogenated intermediate pyrazolo, pyrimido and thiazolo[1,4]benzoxazines. 4,587,336, Cl. 544-105.000.

Boots-Celltech Diagnostics Limited: *See*—
Baker, Terence S., 4,587,212, Cl. 435-7.000.

Boots Company PLC, The: *See*—
Stenzenberger, Horst, 4,587,281, Cl. 523-500.000.

Borase, Vijay; Smith, James F.; and Sagiv, Efraim, to Materials Research Corporation. Method of making ceramic tapes. 4,587,068, Cl. 264-63.000.

Bordato, James M.: *See*—
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.

Borden, Inc.: *See*—
Cummings, Raymond P., 4,587,128, Cl. 426-303.000.

Borg-Warner Corporation: *See*—
Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., 4,586,719, Cl. 277-41.000.

Borgatelli, Carlo: *See*—
Maietti, Adriano; and Borgatelli, Carlo, 4,587,167, Cl. 428-352.000.

Borrman, Bo; and Nylund, Olov, to AB Asea-Atom. Nuclear fuel assembly. 4,587,093, Cl. 376-444.000.

Bortnick, Frank: *See*—
Hartman, John E.; Petrovich, Roger; and Bortnick, Frank, 4,586,688, Cl. 248-538.000.

Borysko, Emil, to Ethicon, Inc. Photoetching process for making surgical needles. 4,587,202, Cl. 430-320.000.

Bossi, Alessandro: *See*—
Cavaterra, Enrico; and Bossi, Alessandro, 4,587,230, Cl. 502-225.000.

Boster, Clark S.: *See*—
Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., 4,586,719, Cl. 277-41.000.

Bott, Theodore R.: *See*—
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.

Boudreau, Daniel A.; Sandini, James M.; and Salas, Edward R., to Honeywell Information Systems Inc. Lockout operation among asynchronous accessers of a shared computer system resource. 4,587,609, Cl. 364-200.000.

Bouiller, Jean G.; and Delonge, Jean-Claude L., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A. Apparatus for the transfer of a complete turbine module from a balancing machine to an engine and vice versa, and method for operating the said apparatus. 4,586,225, Cl. 29-156.80R.

Boultbee, Frank E.: *See*—
Heasdale, William W.; and Boultbee, Frank E., 4,586,287, Cl. 47-1.700.

Bourras-Laspelades, Jacques A. Y.: *See*—
Osmont, Gilles J. N.; and Bourras-Laspelades, Jacques A. Y., 4,587,667, Cl. 378-58.000.

Bowers, Craig R. Subsurface density testing method. 4,587,422, Cl. 250-253.000.

Box, Leonard J.: *See*—
Kellerman, Hillel; Kellerman, David; and Box, Leonard J., 4,587,144, Cl. 428-36.000.

Boyce, James R., to Schlumberger Technology Corporation. Method for gravel pack evaluation. 4,587,423, Cl. 250-269.000.

BP Chemicals Limited: *See*—
Turtle, Brian L., 4,587,303, Cl. 525-240.000.

Bradford, William M.: *See*—
Mullen, William B., III; Van Hout, James E.; and Bradford, William M., 4,586,764, Cl. 339-17.00M.

Bradley, Gary W.; and Arrington, Stephen T., to Halliburton Company. Methods and compositions for removing copper and copper oxides from surfaces. 4,586,961, Cl. 134-2.000.

Bradley, William P., to Bedford Engineering Co. Mailing sub-assembly with envelope sheet and enclosure sheet. 4,586,651, Cl. 229-68.00R.

Braeuner, Horst, to Original Vogelbauer Corporation, The. Bird cage. 4,586,463, Cl. 119-17.000.

Brain Dust Patents Establishment: *See*—
Kuchler, Fritz, 4,586,409, Cl. 83-112.000.

Brainard, Edward C., II: *See*—
Lapetina, Robert A.; and Brainard, Edward C., II, 4,586,452, Cl. 114-245.000.

Brand, Wilhelm: *See*—
Muller-Erwig, Horst; and Brand, Wilhelm, 4,586,410, Cl. 83-175.000.

Brandes, Wilhelm: *See*—
Regel, Erik; Buchel, Karl H.; Reinecke, Paul; and Brandes, Wilhelm, 4,587,239, Cl. 514-184.000.

Brandt, Inc.: *See*—
Taipale, Dale L.; Winkelman, John H.; and Adams, Thomas P., 4,586,522, Cl. 133-3.00E.

Brandt, Klaus: *See*—
Stiles, James A. R.; Brandt, Klaus; Wainwright, David S.; and Lee, Keith C., 4,587,182, Cl. 429-94.000.

Branson, Terry L.: *See*—
Mak, David W.; and Branson, Terry L., 4,587,647, Cl. 369-270.000.

Brattain, Charles E. Pendulum level. 4,586,263, Cl. 33-353.000.

Brault, Robert G.; and Miller, Leroy J., to Hughes Aircraft Company. Wet process for developing styrene polymer resists for submicron lithography. 4,587,203, Cl. 430-325.000.

Braun, Ernst; and Braun, Gert, to Halbach & Braun. Transfer station from a longwall chain conveyor to a drift chain conveyor. 4,586,753, Cl. 299-43.000.

Braun, Gert: *See*—
Braun, Ernst; and Braun, Gert, 4,586,753, Cl. 299-43.000.

Braun, Hilarion: *See*—
Schutrum, Walter L.; and Braun, Hilarion, 4,587,527, Cl. 346-75.000.

Breckinridge Minerals, Inc.: *See*—
Minden, Carl S., 4,587,006, Cl. 208-410.000.

Breeze, Glenn S.: *See*—
Falce, Louis R.; and Breeze, Glenn S., 4,587,455, Cl. 313-346.0DC.

Breiner, Bruce A., to RCA Corporation. System for orienting a rotating member. 4,587,467, Cl. 318-272.000.

Brejcha, Robert J.; and Kubacki, Leonard J., to Industrial Design Electronic Associates, Inc. Double bullseye for dart game. 4,586,716, Cl. 273-376.000.

Brennan, John; and Tao, Eddie V. P., to Eli Lilly and Company. Process for preparing herbicidal 5-cyano-1-phenyl-N-methyl-1H-pyrazole-4-carboxamide. 4,587,348, Cl. 548-378.000.

Brent, Richard J.: *See*—
Moss, Brian F.; Pilkington, Ian B.; and Brent, Richard J., 4,586,803, Cl. 354-313.000.

Bresnahan, John T.: *See*—
Mugford, Lawrence W.; and Bresnahan, John T., 4,586,696, Cl. 254-122.000.

Breuer, Hermann; Slusarchyk, William A.; Denzel, Theodor; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 2-oxo-1-[[(substituted sulfonyl)amino]-carbonyl]azetidines. 4,587,047, Cl. 260-239.00A.

Bricher, Charles W.; and Snetting, Mark E., to Tennant Company. Machine for preparing a concrete surface for coating. 4,586,213, Cl. 15-320.000.

Brick, Michael J.: *See*—
Dirnberger, Linus R.; Husson, Alan L.; and Brick, Michael J., 4,587,511, Cl. 340-19.00R.

Briere, Pierre, to Thomson-CSF. Process of manufacturing a high-frequency vertical junction field-effect transistor. 4,586,239, Cl. 29-571.000.

Brighton Pharmaceutical, Inc.: *See*—
Arnold, John D., 4,587,252, Cl. 514-282.000.

Briguet, Etienne: *See*—
Heng, Jean-Paul; Marmonier, Andre ; and Briguet, Etienne, 4,586,843, Cl. 403-252.000.

British Columbia Research Council: *See*—
Esplin, Gordon J., 4,586,848, Cl. 405-60.500.

Brittain, David C., to Plough, Inc. Mascara applicator. 4,586,520, Cl. 132-88.700.

Brock, George W.; and Hampton, George J., to Verbatim Corp. Wear resisting undercoat for thin film magnetic recording media. 4,587,157, Cl. 428-216.000.

Brockelt, Michael: *See*—
Knofel, Hartmut; and Brockelt, Michael, 4,587,058, Cl. 560-347.000.

Brois, Stanley J.: *See*—
Thaler, Warren A.; Brois, Stanley J.; and Ferrara, Francis N., 4,587,304, Cl. 525-285.000.

Brondeau, Christian: *See*—
Jartoux, Pierre; and Brondeau, Christian, 4,586,303, Cl. 52-309.160.

Brons, Glen: *See*—
Siskin, Michael; and Brons, Glen, 4,587,004, Cl. 208-429.000.
Siskin, Michael; and Brons, Glen, 4,587,005, Cl. 208-415.000.

Bronstert, Klaus; Hochstein, Waldhelm; Vogel, Hans-Henning; and Rath, Hans P., to BASF Aktiengesellschaft. Quality of isobutene polymers in reactions with maleic anhydride. 4,587,307, Cl. 525-362.000.

Brooks, Burton, to Chemithon Corporation, The. Intermediate product for use in producing a detergent bar. 4,587,029, Cl. 252-91.000.

Brown, Albert P.; and Hundley, John G., to Amoco Corporation. Oxidation with a solid catalyst. 4,587,355, Cl. 562-414.000.

Brown, David; Dowell, Robert I.; Hargreaves, Rodney B.; and Main, Brian G., to Imperial Chemical Industries PLC. 1,3,4-thiadiazin-2-ones. 4,587,246, Cl. 514-222.000.

Brown, David P.; and Brown, John B., to Muiltidrive Limited. Articulated vehicle. 4,586,578, Cl. 180-14.400.

Brown, Ian J.; Bird, John M.; McDougall, Ian L.; and Black, David, to Oxford Magnet Technology Limited. Magnet assembly for use in NMR apparatus. 4,587,504, Cl. 335-216.000.

Brown, John B.: *See—*
Brown, David P.; and Brown, John B., 4,586,578, Cl. 180-14.400.

Brown, Robert L. Tangle free cord holder. 4,586,675, Cl. 242-85.100.

Bruhn, Hans-Athanas: *See—*
Harth, Hubert; Wuest, Willi; Bruhn, Hans-Athanas; Danielisz, Miklos; and Heinrich, Erbo, 4,587,059, Cl. 558-464.000.

Bruker Analytische Messtechnik GmbH: *See—*
Muller, Wolfgang; Knuttel, Bertold; and Laukien, Gunther, 4,587,490, Cl. 324-320.000.

Brunner, Arthur: *See—*
Hartig, Jurgen; Schuch, Gunter; Stoessel, Armin; Herrmann, Guenter; Brunner, Arthur; Zehner, Peter; and Grosskinsky, Otto-Alfred, 4,587,363, Cl. 568-357.000.

BSD Medical Corporation: *See—*
Turner, Paul F., 4,586,516, Cl. 128-804.000.

BSG-Schalttechnik GmbH & Co. K.G.: *See—*
Prestel, Fritz, 4,587,386, Cl. 200-61.58R.

BTU Engineering Corporation: *See—*
Orbeck, Gary A., 4,586,898, Cl. 432-122.000.

Buccieri, Agostino R., Jr. Lottery marking guide. 4,586,906, Cl. 434-364.000.

Buchanan, Bradley, to M&D Balloons. Inflation valve for balloons and the like. 4,586,910, Cl. 446-220.000.

Buchel, Karl H.: *See—*
Regel, Erik; Buchel, Karl H.; Reinecke, Paul; and Brandes, Wilhelm, 4,587,239, Cl. 514-184.000.

Bucher, George D., to Westinghouse Electric Corp. Fuel rod assembly for a nuclear reactor. 4,587,094, Cl. 376-451.000.

Bucke, Christopher; and Cheetham, Peter S. J., to Tate & Lyle Public Limited Company. Method of reducing dental plaque formation with products for human or animal consumption using isomaltulose sucrose substitute. 4,587,119, Cl. 424-48.000.

Budai, Zoltan; Benko, Pal; Ratz nee Simonek, Ildiko ; Rakoczy nee Pinter, Eva; Magyar, Karoly; Kelemen, Jozsef; and Mandi, Attila, to Egyt Gyogyszervegyeszeti Gyar. Cycloalkane derivatives and fodder compositions containing the same. 4,587,261, Cl. 514-542.000.

Budd Company: *See—*
Guha, Probir K.; Iseler, Kenneth A.; and Yen, Robert C., 4,587,280, Cl. 523-222.000.

Buehler, Robert J.: *See—*
Baxter, Larry K.; and Buehler, Robert J., 4,586,260, Cl. 33-125.00C.

Buhl, Reinhard, to Lemforder Metallwaren. Elastic joint. 4,586,840, Cl. 403-228.000.

Buhler, Eugen. Mold making plant. 4,586,555, Cl. 164-180.000.

Buhrer, Carl F., to GTE Laboratories Incorporated. Fluorescent light source with parallel DC discharges. 4,587,462, Cl. 315-260.000.

Bunnell, Edward D., to AMP Incorporated. High density mother/-daughter circuit board connector. 4,587,596, Cl. 361-398.000.

Burchart, Joachim, to Nixdorf Computer AG. Means for generating a tactile character field. 4,586,903, Cl. 434-114.000.

Burge, Harland L.; and Hardgrove, John A., to TRW Inc. Method and apparatus for in-flight combustion of carbonaceous fuels. 4,586,443, Cl. 110-347.000.

Burgess, Bruce E.; and Gorick, Joel C., to Candlepower Inc. Universal headlight. 4,587,598, Cl. 362-72.000.

Burke, Edward R. Axe. 4,586,258, Cl. 30-308.100.

Burke, Michael W.: *See—*
De Spain, James R.; and Burke, Michael W., 4,586,293, Cl. 51-7.000.

Burkhardt, Frederick R., Jr., to Virginia Corporation of Richmond. Ultrasonic pipe inspection system. 4,536,379, Cl. 73-622.000.

Burlington Ind., Inc.: *See—*
Lassiter, B. Dean; Daniel, Vernon T.; and Sumner, John H., 4,586,323, Cl. 57-1.00R.

Burlington Industries, Inc.: *See—*
Blalock, Paul B.; and Schwartz, William C., 4,586,934, Cl. 8-483.000.

Burmah-Castrol, Inc.: *See—*
Pratt, Robert E., 4,587,368, Cl. 585-12.000.

Burroughs Corporation: *See—*
Bell, John L., 4,587,650, Cl. 370-86.000.

Burroughs Wellcome Co.: *See—*
Nichol, Charles A.; Reinhard, John F., Jr.; Smith, Gary K.; and Bigham, Eric C., 4,587,340, Cl. 544-258.000.
Roth, Barbara; and Rauckman, Barbara S., 4,587,341, Cl. 544-324.000.

Burrowes, David E.; Holmes, Alan W.; and Valentine, Daniel R., to Energy Innovations, Inc. Noncontact shaft angle detector. 4,587,513, Cl. 340-347.00P.

Buschkens, Guido; and Nobis, Peter, to Messer Griesheim GmbH. Process and device for metering small amounts of a low boiling liquified gas. 4,586,343, Cl. 62-55.000.

Busse, Oswald, to Passavant-Werke AG & Co. KG. Plate filter press. 4,587,015, Cl. 210-224.000.

Bussell, Clifford J., to Kraft, Inc. Minutely cross channeled voiding sealing systems. 4,586,317, Cl. 53-451.000.

Butcher, John G.: *See—*
Dean, Sidney; and Butcher, John G., 4,586,362, Cl. 72-391.000.
Dean, Sidney; and Butcher, John G., 4,586,363, Cl. 72-391.000.

Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, to Metal Box p.l.c. Method and apparatus for making dimensionally stable thermoplastic tubular articles. 4,587,075, Cl. 264-573.000.

Butler, Gary M.; and Bakewicz, Frank J., to General Motors Corporation. Molded plastic bumper and mounting bracket assembly. 4,586,738, Cl. 293-107.000.

Butler, James R.: *See—*
Forward, Cleve H.; Butler, James R.; and Licht, William P., 4,587,371, Cl. 585-467.000.

Butler, Lloyd V.: *See—*
Argoud, Maurice J.; Walker, Walter L.; and Butler, Lloyd V., 4,586,487, Cl. 126-418.000.

Buysch, Hans-Josef; Klipper, Reinhold; Lange, Peter M.; and Mues, Peter, to Bayer Aktiengesellschaft. N-phenyl-N'-vinylethyleneureas. 4,587,347, Cl. 548-317.000.

Buzby, George C., Jr., to American Home Products Corporation. Anti-arrhythmic agents. 4,587,360, Cl. 564-92.000.

Byogal Gyogyszergyar: *See—*
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.

C. Reichert Optische Werke, AG: *See—*
Bierleutgeb, Fritz; and Kappl, Gerhard, 4,586,794, Cl. 350-520.000.

Cadre Corporation, The: *See—*
Battles, Brett E., 4,586,895, Cl. 432-2.000.

Cahen, Raymond M.: *See—*
Debras, Guy L. G.; De Clippeleir, Georges E. M. J.; and Cahen, Raymond M., 4,587,375, Cl. 585-671.000.

Caillault, Michel R.: *See—*
Lepretre, Marc V. A.; Balzano, Lucien D.; and Caillault, Michel R., 4,586,873, Cl. 417-54.000.

Cairns, John F.; Denton, David A.; and Izzard, Patrick A., to Imperial Chemical Industries PLC. Cathode for use in electrolytic cell. 4,587,001, Cl. 204-290.00R.

Cais, Michael; and Shimoni, Moshe, to Technion Research & Development Foundation, Ltd. Non-centrifugation method for immunoassay of materials. 4,587,221, Cl. 436-500.000.

Calgon Carbon Corporation: *See—*
Cooley, Richard L., 4,586,941, Cl. 55-385.00R.

Calman, Donald R. Method of simulated engraved printing. 4,586,431, Cl. 101-32.000.

Calvert, William L.: *See—*
Paulsen, David C.; Calvert, William L.; Mitchell, Dennis R.; and Gravelle, Larry D., 4,586,763, Cl. 339-6.00R.

Camacho, David P.: *See—*
Camacho, Salvador L.; and Camacho, David P., 4,587,397, Cl. 219-121.0PM.

Camacho, Salvador L.; and Camacho, David P., to Plasma Energy Corporation. Plasma arc torch. 4,587,397, Cl. 219-121.0PM.

Cambridge Instruments Limited: *See—*
Barker, John C.; and Cruttwell, Ian A., 4,587,617, Cl. 364-507.000.

Camco Inc.: *See—*
St. Louis, Robert M., 4,586,269, Cl. 34-133.000.

Campbell, Bruce D.; Naidoff, Robert J.; and Tylor, Richard E., to Raychem Corporation. Signal coupler for buffered optical fibers. 4,586,783, Cl. 350-96.150.

Campbell, Douglas D.; and Donovan, Mary B., to Minnesota Mining and Manufacturing Company. Flocked floor mat with foraminous layer. 4,587,148, Cl. 428-88.000.

Campbell Taggart, Inc.: *See—*
Patton, James C.; Bennet, Richard G.; Kasper, Dean J.; and Wisakowsky, Eugene E., 4,587,126, Cl. 426-19.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources: *See—*
Nicholson, Patrick S.; and Yamashita, Kimihiro, 4,586,991, Cl. 204-61.000.

Canadian Patents & Dev. Limited: *See—*
Tremblay, Yves; Kawasaki, Brian S.; and Bilodeau, Francois, 4,586,784, Cl. 350-96.150.

Canals, Carlos. Work-step for extension ladder. 4,586,586, Cl. 182-118.000.

Candlepower Inc.: *See—*
Burgess, Bruce E.; and Gorick, Joel C., 4,587,598, Cl. 362-72.000.

Canon Kabushiki Kaisha: *See—*
Asano, Junichi, 4,587,532, Cl. 346-134.000.
Hirai, Yutaka; Tomida, Yoshinori; Matsuda, Hiroshi; and Nishimura, Yukuo, 4,586,980, Cl. 156-655.000.
Matsuoka, Mikiharu; Katayama, Hirohiko; and Horyu, Sakae, 4,587,663, Cl. 377-2.000.
Nagano, Akihiko; and Iizuka, Kiyoshi, 4,586,802, Cl. 354-219.000.
Okumura, Ichiro; and Izukawa, Kazuhiro, 4,587,452, Cl. 310-328.000.
Saito, Akio; Aoki, Seiichi; Inamoto, Tadayoshi; Yokoi, Katsuyuki; and Ikeda, Masami, 4,587,534, Cl. 346-140.00R.
Saito, Jun; and Takahashi, Yuji, 4,587,536, Cl. 346-160.000.
Saitoh, Keishi; Ohnuki, Yukihiko; and Ohno, Shigeru, 4,587,190, Cl. 430-85.000.
Suzuki, Takashi; Matsumura, Susumu; and Kitagishi, Nozomu, 4,586,786, Cl. 350-169.000.
Takayama, Nobutoshi; Edakubo, Hiroo; and Takimoto, Hiroyuki, 4,587,580, Cl. 360-77.000.
Tamura, Katsuhide, 4,587,038, Cl. 252-511.000.
Tanaka, Tsunefumi; and Ikemori, Keiji, 4,586,793, Cl. 350-426.000.
Tokuhara, Mitsuhiro; and Minami, Setsuo, 4,586,814, Cl. 355-55.000.
Tsunekawa, Tokuichi; Sakai, Shinji; and Kinoshita, Takao, 4,587,415, Cl. 250-204.000.
Watanabe, Yoshitaka, 4,587,535, Cl. 346-140.00R.

Cantarelli, Giorgio; Picciola, Giampaolo; Ravenna, Franco; and Riva, Mario. 4-alkyl-thiophenyl-ethanolamines, having an activity the cerebral circulation, the blood platelet-aggregation and the lipenia. 4,587,248, Cl. 514-255.000.

Capecchi, Augusto. Touch pad indicating arrival during swimming contest. 4,587,385, Cl. 200-52.00R.

Capps, Grover H. Fifth wheel with stop means. 4,586,726, Cl. 280-432.000.

Caracteres S.A.: *See*—
Moulin, Blaise, 4,586,836, Cl. 400-144.200.

Carbonnel, Henri. Lateral basin for electromagnetic pumping in a foundry. 4,586,698, Cl. 266-237.000.

Carcia, Peter F., to Du Pont de Nemours, E. I., and Company. Layered coherent structures for magnetic recording. 4,587,176, Cl. 428-611.000.

Card, Joseph L.: *See*—
Card, Roy T.; and Card, Joseph L., 4,586,445, Cl. 112-79.00R.

Card-Monroe Corporation: *See*—
Card, Roy T.; and Card, Joseph L., 4,586,445, Cl. 112-79.00R.

Card, Roy T.; and Card, Joseph L., to Card-Monroe Corporation. High speed tufting machine. 4,586,445, Cl. 112-79.00R.

Carl-Zeiss-Stiftung, Heidenheim/Brenz: *See*—
Herzog, Klaus, 4,587,622, Cl. 364-561.000.

Carlin, Robert N., to Rolls-Royce Limited. Anti rotation device. 4,586,329, Cl. 60-226.200.

Carlson, Richard C.; DeRespiris, Donald L.; Sacco, Anthony R.; Groszek, Donald J.; and Ivancic, Bonnie M., to Eltech Systems Corporation. Plate and frame heat exchanger assembly with anodic protection. 4,586,562, Cl. 165-134.100.

Carlsson, Per-Olov A. V.; and Karlberg, Rolf E., to Gambro Lundia AB. Hose set for extracorporeal treatment of blood and similar liquids. 4,586,925, Cl. 604-251.000.

Carollo, Sammy F.; and Dance, William E., to LTV Aerospace and Defense Co. Neutron and X-ray radiation combined inspection means and method. 4,587,555, Cl. 358-111.000.

Carpenter, Gary: *See*—
Carter, William; and Carpenter, Gary, 4,586,684, Cl. 244-137.00R.

Carpenter, George J., to Warner-Lambert Technologies, Inc. Broncho-scope with small gauge viewing attachment. 4,586,491, Cl. 128-6.000.

Carrier Vibrating Equipment, Inc.: *See*—
De Spain, James R.; and Burke, Michael W., 4,586,293, Cl. 51-7.000.

Carroll, Thomas A.; and Yetter, Harold H., to United States of America, Energy. Machine imparting complex rotary motion for lapping a spherical inner diameter. 4,586,292, Cl. 51-2.00R.

Carter, Donald L., to International Business Machines Corporation. Combination rotary gas bearing and seal apparatus. 4,586,830, Cl. 384-121.000.

Carter, William; and Carpenter, Gary, to Western Gear Corporation. Aircraft loading apparatus. 4,586,684, Cl. 244-137.00R.

Cartwright, David, to Imperial Chemical Industries PLC. Herbicidal pyridyloxy phenoxy propanols or derivatives thereof herbicidal composition containing same and their herbicidal use. 4,586,953, Cl. 71-94.000.

Cascio, Giuseppe: *See*—
Manghisi, Elso; and Cascio, Giuseppe, 4,587,242, Cl. 514-211.000.

Casey, Harold W. Turn signal alarm. 4,587,512, Cl. 340-52.00D.

Casey, Sheryl K., to Economics Laboratory, Inc. Foamable, acidic cleaning compositions. 4,587,030, Cl. 252-92.000.

Casio Computer Co., Ltd.: *See*—
Sano, Shigenori, 4,586,416, Cl. 84-1.030.

Cason, David A. Spring activated cam anchor. 4,586,686, Cl. 248-1.000.

Castagnoli, Neal: *See*—
Goodman, Murray; Castagnoli, Neal; Jacobson, Kenneth; Melmon, Kenneth L.; Rosenkranz, Roberto P.; and Verlander, Michael S., 4,587,046, Cl. 530-330.000.

Castrup, Rolf, to Ermeto Armaturen GmbH. Tube fitting with ferrule. 4,586,731, Cl. 285-4.000.

Catallo, Frank; and Foreman, Donald. Apparatus for treating and straightening tubular fabric. 4,586,222, Cl. 26-51.300.

Caterpillar Industrial Inc.: *See*—
Ohman, Donald M., 4,586,331, Cl. 60-422.000.

Caterpillar Tractor Co.: *See*—
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,586,338, Cl. 60-618.000.
Schexnayder, Lawrence F., 4,586,332, Cl. 60-468.000.

Cathey, Thaddeus F.; and Nelson, Rodney J., to Uniroyal Power Transmission Company, Inc. Power transmission system and toothed belt therefor. 4,586,915, Cl. 474-205.000.

Caughey, Robert A., to New Hampshire Flakeboard. Gasifier method and apparatus. 4,586,442, Cl. 110-229.000.

Cavalli, Alfredo. Steam iron with an excess pressure safety device. 4,586,278, Cl. 38-77.810.

Cavaterra, Enrico; and Bossi, Alessandro, to Montepolimeri S.p.A. Supported catalysts for the synthesis of 1,2-dichloroethane by oxychlorination of ethylene within a fluidized bed and method for the preparation of the catalysts. 4,587,230, Cl. 502-225.000.

Cavin, Eugene F. Remote switching device for electric trolling motor. 4,587,388, Cl. 200-86.500.

Cegedur Societe de Transformation de l'Aluminium Pechiney: *See*—
Baril, Jacques; and Chailleux, Georges, 4,586,310, Cl. 52-766.000.

Ceisel, Stephen G.: *See*—
Kilner, Peter H.; Egan, Joseph P., Jr.; Ceisel, Stephen G.; and Schammel, Wayne P., 4,587,350, Cl. 549-245.000.

Cell Medical Corporation: *See*—
de Medinaceli, Luis, 4,586,504, Cl. 128-335.500.

CEM - Compagnie Electro-Mecanique: *See*—
Chausse , Bernard; Delassus, Jean; and Leon, Claude, 4,587,392, Cl. 219-10.710.

Cemenska, Richard A.: *See*—
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,586,338, Cl. 60-618.000.

Centrifugal Piston Expander, Inc.: *See*—
Dibrell, Edwin W.; O'Neal, Glenn B.; and Schaich, Wilbur A., 4,586,426, Cl. 91-176.000.

Cepin, Hermann: *See*—
Ungar, Karl-Heinz; and Cepin, Hermann, 4,587,659, Cl. 373-96.000.

Cerra, Joseph M.: *See*—
Monge, William A.; and Cerra, Joseph M., 4,586,314, Cl. 53-444.000.

Cetec AG: *See*—
Tinner, Friedrich, 4,586,693, Cl. 251-56.000.

Cetus Corporation: *See*—
Geigert, John; and Neidleman, Saul L., 4,587,217, Cl. 435-155.000.
Mezei, Louis M.; Reeves, Richard W.; Leath, Richard A.; and Widunas, Joseph T., 4,586,546, Cl. 141-2.000.

Cgee Alsthom: *See*—
Heng, Jean-Paul; Marmonier, Andre ; and Briguet, Etienne, 4,586,843, Cl. 403-252.000.

Chabin Corporation: *See*—
Tengler, John N.; and Pilny, James C., 4,586,769, Cl. 339-59.00R.

Chailleux, Georges: *See*—
Baril, Jacques; and Chailleux, Georges, 4,586,310, Cl. 52-766.000.

Chaki, Takao, to Clarion Co., Ltd. Cross arm mechanism in pushbutton tuner. 4,586,391, Cl. 74-10.370.

Chamberlain, Terence R., to Sun Chemical Corporation. Nickel complex pigments of bis-azomethines. 4,587,339, Cl. 544-225.000.

Chambers, Robert W., to RCA Corporation. System for orienting one body relative to a second body in three orthogonal directions. 4,586,702, Cl. 269-310.000.

Chamuel, Jacques R., to Charles Stark Draper Laboratory, Inc., The. Nondestructive ultrasonic transducer. 4,586,381, Cl. 73-643.000.

Chan, Yat S.: *See*—
Tantram, Anthony D. S.; and Chan, Yat S., 4,587,003, Cl. 204-412.000.

Chandos, Ronald V.: *See*—
Marino, Joseph T., Jr.; and Chandos, Ronald V., 4,587,625, Cl. 364-578.000.

Chandra, Suresh; and Rohde, Robert S., to United States of America, Army. Optical angular/linear motion detector. 4,586,821, Cl. 356-363.000.

Chang, Bong H.: *See*—
Blaser, Don E.; Chang, Bong H.; and Baker, Charles L., 4,587,010, Cl. 208-127.000.

Chang, J. K.: *See*—
Barchas, Jack D.; Weber, Eckard; Evans, Christopher J.; Wei, E. T.; Chang, J. K.; Fuchs, Ingbert; and Mues, Gabriele, 4,587,233, Cl. 514-15.000.

Chapnick, Bernard. Shoe insert construction. 4,586,273, Cl. 36-44.000.

Charles Stark Draper Laboratory, Inc., The: *See*—
Chamuel, Jacques R., 4,586,381, Cl. 73-643.000.

Charlton Associates: *See*—
Saunders, Jimmy G., 4,586,296, Cl. 51-281.0SF.

Chausse , Bernard; Delassus, Jean; and Leon, Claude, to CEM - Compagnie Electro-Mecanique. Electro-magnetic induction scrolling device for heating flat products. 4,587,392, Cl. 219-10.710.

Cheatham, James L., Jr. Outrigger lure depth control. 4,586,286, Cl. 43-27.400.

Check-Strip Ltd.: *See*—
Derby, Steven C., 4,586,975, Cl. 156-191.000.

Cheetham, Peter S. J.: *See*—
Bucke, Christopher; and Cheetham, Peter S. J., 4,587,119, Cl. 424-48.000.

Cheetham, Robert, to General Electric Company, P.L.C., The. Line identification apparatus for a telecommunications exchange. 4,587,381, Cl. 179-18.0FH.

Chemithon Corporation, The: *See*—
Brooks, Burton, 4,587,029, Cl. 252-91.000.

Chen, Jong J.: *See*—
Lutz, Irvin H.; and Chen, Jong J., 4,586,344, Cl. 62-101.000.

Chen, Thomas Y.; Clemens, Jon K.; and Auerbach, Victor, to RCA Corporation. Stylus kicker having kick energy minimization means. 4,587,570, Cl. 358-342.000.

Chen, Yu-Chuan, to Wen-Kuei Lee. Two-stage exercise bike. 4,586,706, Cl. 272-73.000.

Chern, Mao-Jin; Gunther, John E.; and Smith, Ronald T., to Hughes Aircraft Company. Directional diffusing screen with suppressed zero-order light. 4,586,780, Cl. 350-3.700.

Cherukuri, Subraman R.; Hriscisce, Frank T.; Siecke, Albert E.; and Wei, You C., to Warner-Lambert Company. Non-staling chewing gum compositions and improved method of preparation. 4,587,125, Cl. 426-3.000.

Chesnut, M. Gaines. Cartridge magazine for use with a plurality of firearms. 4,586,281, Cl. 42-50.000.

Chevron Research Company: *See*—
Quann, Richard J., 4,587,012, Cl. 208-251.00H.

Child, Ralph G.: *See*—
Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang I., 4,587,331, Cl. 536-55.000.

Children's Hospital Medical Center: *See*—
Clark, Leland C., Jr., 4,586,511, Cl. 128-653.000.
Chin, Danny, to RCA Corporation. Apparatus for generating the magnitude of the vector sum of two orthogonal signals as for use in a digital TV receiver. 4,587,552, Cl. 358-28.000.
Chin, David D.: *See*—
Yau, Leopoldo D.; Gasser, Robert A., Jr.; Week, Kenneth R., Jr.; Yu, Jick M.; and Chin, David D., 4,587,138, Cl. 427-88.000.
Chizmar, David A.: *See*—
Costlow, Annette M.; Chizmar, David A.; and Cooper, Frank W., 4,586,249, Cl. 29-723.000.
Chloride Group Public Limited Company: *See*—
Gibson, Ian K.; and Peters, Kenneth, 4,587,181, Cl. 429-59.000.
Chlumsky, Lubomir, to Siemens Aktiengeellschaft. Device for forming tactile display. 4,586,904, Cl. 434-114.000.
Choate, Bruce T.; and Houck, Richard C., to Goodyear Tire & Rubber Company, The. Transfer apparatus and method for air spring assembly apparatus. 4,586,234, Cl. 29-430.000.
Chorlton, Pauline: *See*—
McNeight, David L.; Lawrence, John G.; and Chorlton, Pauline, 4,586,707, Cl. 273-1.00R.
Chou, Yueting: *See*—
Dyroff, David R.; and Chou, Yueting, 4,587,033, Cl. 524-405.000.
Chow, Alfred W.; and Theodorides, Vassilios J., to SmithKline Beckman Corporation. Anthelmintic benzamides. 4,587,361, Cl. 564-179.000.
Christophe, Theophile; and Moatti, Jean-Claude, to Georges Moatti. Filter incorporating multiple chambers for receiving the filtered fluid and another fluid issuing from the residue of the main filtration. 4,587,017, Cl. 210-323.100.
Chrysler Corporation: *See*—
Mugford, Lawrence W.; and Bresnahan, John T., 4,586,696, Cl. 254-122.000.
Nogle, Thomas D., 4,586,401, Cl. 74-752.00A.
Chu, Yiu T.: *See*—
Winters, Simon N.; and Chu, Yiu T., 4,586,711, Cl. 273-138.00R.
Ciba-Geigy AG: *See*—
Moss, Brian F.; Pilkington, Ian B.; and Brent, Richard J., 4,586,803, Cl. 354-313.000.
Ciba-Geigy Corporation: *See*—
Ackermann, Peter; Gsell, Laurenz; and Kohler, Boris, 4,587,255, Cl. 514-345.000.
Bedekovic, Davor; and Fletcher, Ian J., 4,587,343, Cl. 546-116.000.
Bedekovic, Davor; and Fletcher, Ian J., 4,587,539, Cl. 346-220.000.
Fah, Hansjakob, 4,587,353, Cl. 549-470.000.
Renner, Alfred, 4,587,317, Cl. 526-259.000.
Schmid, Rolf; Zondler, Helmut; Fischer, Michael; and Stauffer, Werner, 4,587,311, Cl. 525-504.000.
Sedelmeier, Gottfried, 4,587,048, Cl. 260-239.00A.
Winter, Roland A. E.; and Detlefsen, Robert E., 4,587,346, Cl. 548-260.000.
Cinema Products Corporation: *See*—
DiGiulio, Edmond, 4,587,572, Cl. 360-14.300.
Ciocca, Joseph A.; and Knowles, Gregory W., to Grumman Allied Industries, Inc. Multi-effect rotary distillation apparatus. 4,586,985, Cl. 202-174.000.
City Technology Limited: *See*—
Tantram, Anthony D. S.; and Chan, Yat S., 4,587,003, Cl. 204-412.000.
Claracq, Michel. Device for partly occluding a vessel in particular the inferior vena cava and inherent component of this device. 4,586,501, Cl. 128-325.000.
Claren, Jan S.; and Olsson, Lars-Goran, to Gambro Lundia AB. Device for measuring concentration including valve means. 4,587,219, Cl. 435-288.000.
Clarion Co., Ltd.: *See*—
Chaki, Takao, 4,586,391, Cl. 74-10.370.
Clark, Harold E., to Futures C, Inc. Collapsible photoreceptive sheet including a high concentration of voids. 4,587,191, Cl. 430-97.000.
Clark, Leland C., Jr., to Children's Hospital Medical Center. Methods and compositions for detecting and imaging a gas in an animal by nuclear magnetic resonance. 4,586,511, Cl. 128-653.000.
Clarke, Robert E.: *See*—
Morgan, Garth A.; Menadue, William I.; and Clarke, Robert E., 4,586,387, Cl. 73-862.050.
Clecim SA: *See*—
Motte, Jean-Pierre; and Maurer, Ghislain, 4,587,660, Cl. 373-108.000.
Clemens, Jon K.: *See*—
Chen, Thomas Y.; Clemens, Jon K.; and Auerbach, Victor, 4,587,570, Cl. 358-342.000.
Clementi, John B.: *See*—
Dapra, David J.; Clementi, John B.; and Morelli, Robert J., 4,586,497, Cl. 128-92.00E.
Clik-Cut, Inc.: *See*—
Ruff, Stanley L.; and Stubbmann, Albert, 4,586,639, Cl. 225-1.000.
CMI, Inc.: *See*—
Talbot, Douglas C.; and Witler, James L., 4,587,427, Cl. 250-339.000.
Coal Industry (Patents) Limited: *See*—
Vincent, James H.; Mark, David; Gibson, Harold; and Lynch, Gordon, 4,586,389, Cl. 73-863.220.
Coast Foundry & Manufacturing Company: *See*—
Stephens, James B., 4,586,692, Cl. 251-15.000.
Coated Electrodes Limited: *See*—
Ball, Kevin D.; and Davies, Peter, 4,587,658, Cl. 373-95.000.
Cobaugh, Robert F.; Fedder, James L.; and Taylor, Attalee S., to AMP Incorporated. Improved card edge connector. 4,586,772, Cl. 339-75.0MP.
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Nilsson, Jack E., Sr.; and Cochran, Charles D., 4,586,334, Cl. 60-524.000.
Cocke, John; and DiStefano, Thomas H., to International Business Machines Corporation. System for position detection on a rotating disk. 4,587,579, Cl. 360-75.000.
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Holland, Charlie R.; and DelPercio, Michael J., 4,586,633, Cl. 221-257.000.
Colburn, Richard P., to United States of America, Energy. Method for removing cesium from a nuclear reactor coolant. 4,587,083, Cl. 376-313.000.
Colby, Thomas H.; and Dong, Walter, to Shell Oil Company. Stabilization of cyanohydrins. 4,587,060, Cl. 558-304.000.
Cole, Paul M., to Du Pont de Nemours, E. I., and Company. Centrifuge rotor having a load transmitting arrangement. 4,586,918, Cl. 494-20.000.
Coleman, Alan B.: *See*—
Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., 4,586,719, Cl. 277-41.000.
Collins & Aikman Corporation: *See*—
Cooper, James J., 4,586,446, Cl. 112-79.00R.
Collins, Curran N., to Big Four Equipment, Inc. Centerpost drive for a tire changing machine. 4,586,551, Cl. 157-1.240.
Collins Dynamics, Inc.: *See*—
Collins, William J., 4,587,601, Cl. 362-235.000.
Collins, Mark C., to Sony Corporation. Television standards converters. 4,587,556, Cl. 358-140.000.
Collins, Michael S.; and Roby, Robert E., to Miles Laboratories, Inc. High titer Pseudomonas immune serum globulin. 4,587,121, Cl. 424-87.000.
Collins, Steven R.: *See*—
Glaser, Roger M.; Glaser, Marcus; Collins, Steven R.; and Strayer, Jonathan R., 4,586,510, Cl. 128-423.00W.
Collins, Virgil H., Jr. Conical dome collapsible tube dispenser for dispensing liquids. 4,586,635, Cl. 222-94.000.
Collins, William J., to Collins Dynamics, Inc. Combined flood and spot light incorporating a reflector member of circular and parabolic longitudinal cross section. 4,587,601, Cl. 362-235.000.
Colp, George O. Gutter guard. 4,586,298, Cl. 52-12.000.
Comert, Ahmet; and Petit, Dominique. Adhesive thermoplastic compositions. 4,587,289, Cl. 524-505.000.
Commissariat a l'Energie Atomique: *See*—
Bessedine, Anatole, 4,587,077, Cl. 376-215.000.
Fajeau, Maurice; and Croxatto, Sylvain, 4,587,079, Cl. 376-282.000.
Feutrel, Claude, 4,587,092, Cl. 376-438.000.
Commonwealth of Australia, The: *See*—
Morgan, Garth A.; Menadue, William I.; and Clarke, Robert E., 4,586,387, Cl. 73-862.050.
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Lyaudet, Georges; and Vial, Jean, 4,587,109, Cl. 423-15.000.
Condrac, Edward: *See*—
Hohlweg, William C.; and Condrac, Edward, 4,586,870, Cl. 415-1.000.
Connell, Peter P. R.; and Yeomans, Michael, to RACAL-DANA Instruments, Ltd. Measurement of elapsed time for a predetermined frequency shift. 4,587,483, Cl. 324-79.00R.
Conoco Inc.: *See*—
Ivie, Randall G.; and Thomason, William H., 4,586,371, Cl. 73-150.00A.
Oda, Ronald L.; Beck, Jeffrey L.; Blubaugh, Robert M.; Harris, Gary R.; Shaw, Ricky L.; and Evans, Michael P., 4,586,852, Cl. 406-14.000.
Sweeney, William T., 4,586,717, Cl. 277-15.000.
Sweeney, William T.; and Beck, Jeffrey L., 4,586,853, Cl. 406-14.000.
Consolidated Papers, Inc.: *See*—
Williams, Donald H.; and Jones, LeRoy, Sr., 4,586,916, Cl. 493-10.000.
Continental Plastic Corporation: *See*—
Alter, Richard R., 4,586,604, Cl. 206-210.000.
Controls Company of America: *See*—
Willigman, John, 4,587,389, Cl. 200-153.0LB.
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., to Scans Associates, Inc. Method and apparatus for electronic leak testing. 4,587,619, Cl. 364-552.000.
Cook, Incorporated: *See*—
Osborne, Thomas A., 4,586,926, Cl. 604-272.000.
Cooley, James, to U.S. Plywood Corporation. Laminated panel and process. 4,587,141, Cl. 427-379.000.
Cooley, Richard L., to Calgon Carbon Corporation. Sewer odor adsorber. 4,586,941, Cl. 55-385.00R.
Cooper, Frank W.: *See*—
Costlow, Annette M.; Chizmar, David A.; and Cooper, Frank W., 4,586,249, Cl. 29-723.000.

Cooper, Frank W., Jr.; and Vogeleer, John P., to Westinghouse Electric Corp. Apparatus for sleeving tubes in hostile environments. 4,586,250, Cl. 29-727.000.
Cooper, James J., to Collins & Aikman Corporation. Appsratus and method for eliminating stop marks in carpets on tufting machines. 4,586,446, Cl. 112-79.00R.
Cooper, James L., to Eastman Kodak Company. Hydroformylation process employing unmodified osmium-cobalt catalyst. 4,587,364, Cl. 568-451.000.
Cooper, Robin D. G.; Morin, John M., Jr.; and Peters, Lynn R., to Eli Lilly and Company. Preparation of oxazolines. 4,587,053, Cl. 260-245.400.
Cooper, Rosemary J.; Misterka, Walter M.; and Mercier, Real L., to R. E. Phelon Company Incorporated. Universal magnetic utensil mounting bar. 4,586,616, Cl. 211-87.000.
Corboy, John F., Jr.: *See*—
Blackstone, Scott C.; Jastrzebski, Lubomir L.; and Corboy, John F., Jr., 4,586,240, Cl. 29-571.000.
Cordis Corporation: *See*—
Batina, William P.; and Gipson, Lamar H., 4,586,508, Cl. 128-419.0PG.
Gould, Sheldon D.; and Riggs, Gary T., 4,586,923, Cl. 604-95.000.
Herscovici, Harry, 4,586,507, Cl. 128-419.0PG.
Cornelissen, Anton E., to Shell Oil Company. Process for conditioning natural gas for pipeline transport. 4,586,938, Cl. 48-196.00R.
Cornell Research Foundation, Inc.: *See*—
Dalman, G. Conrad; and Lee, Charles A., 4,587,541, Cl. 357-22.000.
Cornell, S. Douglas. Method of making a solar water heater. 4,586,227, Cl. 29-157.00R.
Cornette, Clint G. Sunbathing leg riser. 4,586,207, Cl. 5-444.000.
Cornwall, Susan M.; and Homan, Gary R., to Dow Corning Corporation. Hair setting method using aminoalkyl substituted polydiorganosiloxane. 4,586,518, Cl. 132-7.000.
Corzilius, Rolf; Noack, Horst-Guenter; and Stollbrink, Johann, to Klockner-Humboldt-Deutz AG. Centrifugal pump. 4,586,872, Cl. 415-219.00C.
Cosden Technology, Inc.: *See*—
Forward, Cleve H.; Butler, James R.; and Licht, William P., 4,587,371, Cl. 585-467.000.
Cosimini, Gregory J.; Lo, David S.; and Zierhut, Lawrence G., to Sperry Corporation. Y-domain magnetic memory system. 4,587,636, Cl. 365-87.000.
Costa, Gianluigi, to Tecnodia, s.r.l. Apparatus for automatically inserting transparencies into one piece frames. 4,586,321, Cl. 53-520.000.
Coste, Christian: *See*—
Adatto, Maurice; and Coste, Christian, 4,587,591, Cl. 361-235.000.
Costlow, Annette M.; Chizmar, David A.; and Cooper, Frank W., to Westinghouse Electric Corp. Mandrel having an eddy current probe. 4,586,249, Cl. 29-723.000.
Cosyns, Jean; and Boitiaux, Jean-Paul, to Institut Francais du Petrole. Selectively hydrogenating acetylenic compounds in a high butadiene content C_4 cut. 4,587,369, Cl. 585-259.000.
Couch, Robert P., to United Technologies Corporation. System fault detection in electrostatic flow diagnostics. 4,587,614, Cl. 364-431.020.
Coursen, David L.; and Heffner, James D., to Du Pont de Nemours, E. I., and Company. Borehole stemming with a column of liquefiable and/or vaporizable chunks of solid material. 4,586,438, Cl. 102-313.000.
CPC International Inc.: *See*—
Stauber, Niklaus, 4,587,130, Cl. 426-564.000.
Crane Co.: *See*—
Stephenson, Edward J.; and Kannan, Raghavachari, 4,586,718, Cl. 277-22.000.
Cronin, Michael J., to Lockheed Corporation. Aircraft providing variable and constant electric power. 4,587,436, Cl. 307-21.000.
Crosby, Lawton H., to Morley Furniture Spring Corporation. Modular seat spring assembly. 4,586,700, Cl. 267-105.000.
Crosby Valve & Gage Company: *See*—
Estes, Robert F., 4,586,533, Cl. 137-488.000.
Crossman, Gordon W.: *See*—
Nevarez, Enrique F., 4,586,677, Cl. 242-86.800.
Crossman, Philip E.: *See*—
Dingler, Douglas W.; Gadsbey, James F.; and Crossman, Philip E., 4,586,748, Cl. 297-300.000.
Crowley, Patrick J.; and Williams, John C., to Imperial Chemical Industries PLC. Azolyl-hydroxy alkanols having fungicidal and plant growth regulating properties. 4,586,947, Cl. 71-76.000.
Croxatto, Sylvain: *See*—
Fajeau, Maurice; and Croxatto, Sylvain, 4,587,079, Cl. 376-282.000.
Cruttwell, Ian A.: *See*—
Barker, John C.; and Cruttwell, Ian A., 4,587,617, Cl. 364-507.000.
Cube-System Gerustbau GmbH: *See*—
Kretschmar, Hans-Georg, 4,586,302, Cl. 52-173.00R.
Cubi Cubes Pty. Limited: *See*—
Hawkins, John, 4,586,429, Cl. 99-407.000.
Cubic Western Data: *See*—
Roes, John B.; Winkles, Billy B.; Kelly, Guy M.; Spani, Wayne M.; and Schuster, Donald W., 4,587,434, Cl. 250-556.000.
Cummings, Raymond P., to Borden, Inc. Process for making a snack food product. 4,587,128, Cl. 426-303.000.
Cummins Engine Company, Inc.: *See*—
Fox, Larry D., 4,586,337, Cl. 60-605.000.
Currie, William S.; and DeBaun, David R., to Texaco Inc. Seismic data enhancement method and apparatus. 4,587,642, Cl. 367-40.000.
Curtin, Leonard E., to Harris Corporation. Interface for connecting standard telephones to party lines. 4,587,380, Cl. 179-17.00A.
Curtis, Jeff K.: *See*—
Michaely, William J.; and Curtis, Jeff K., 4,586,954, Cl. 71-94.000.
Curtis, Lindy J.: *See*—
Mankins, William L.; Curtis, Lindy J.; and Stewart, Gene A., 4,587,096, Cl. 419-27.000.
Cushman, Glen P., to Boeing Company, The. High voltage temperature compensated foldback circuit. 4,587,476, Cl. 323-276.000.
Cushman, Robert B.: *See*—
Kirsch, Wolff M.; Hua, Zhu Y.; and Cushman, Robert B., 4,586,503, Cl. 128-334.00R.
CXC Corporation: *See*—
Nelson, Gary A.; Godding, Patrick N.; Schumaker, Richard E.; Walter, Keith D.; Marrone, Edward S.; Gates, Stillman F.; Rigsbee, Everett O., III; and Teener, Michael D., 4,587,651, Cl. 370-88.000.
Dacey, John W.: *See*—
Vancelette, Stanley R.; Hanson, Waldo B.; and Dacey, John W., 4,586,670, Cl. 242-55.000.
Dahan, Jose , to Rodam, S.A. Nipple for the feeding of nursing infants, or for stimulation of their buccal motions. 4,586,621, Cl. 215-11.00R.
Daikin Kogyo Co., Ltd.: *See*—
Koba, Yositaka; Hayashi, Yoshiki; and Torikoshi, Kunikazu, 4,586,485, Cl. 126-248.000.
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,587,316, Cl. 526-247.000.
Ohmori, Akira; Tomihashi, Nobuyuki; and Tamaru, Sinji, 4,587,165, Cl. 428-334.000.
Daikohara, Tamotsu: *See*—
Hiraga, Masaharu; and Daikohara, Tamotsu, 4,586,874, Cl. 417-222.000.
Daikoku, Takahiro: *See*—
Higeta, Kazuya; Fujioka, Kazumasa; Nemoto, Takeo; Daikoku, Takahiro; and Nakajima, Isao, 4,587,399, Cl. 219-216.000.
Daimler-Benz Aktiengesellschaft: *See*—
Tank, Eggert; and Straub, Peter, 4,586,554, Cl. 164-97.000.
Vogler, Gunther, 4,586,369, Cl. 73-117.300.
Dainippon Screen Mfg. Co., Ltd.: *See*—
Miyauchi, Yoshio; Takenaka, Kiyosi; and Bessho, Yoshihiko, 4,586,809, Cl. 355-10.000.
Dainippon Screen Seizo Kabushiki Kaisha: *See*—
Kondo, Shuzi; Hirose, Iwao; and Wakabayashi, Masayoshi, 4,586,978, Cl. 156-540.000.
Dako-Werkzeugfabriken David Kotthaus GmbH & Co. KG: *See*—
Jurgensmeyer, Willi; Honsberg, Friedrich-Wilhelm; and Halbach, Kurt, 4,586,360, Cl. 72-328.000.
Dal Poz, Giuseppe: *See*—
Fugazza, Ermanno; and Dal Poz, Giuseppe, 4,586,466, Cl. 123-179.00S.
Dalman, G. Conrad; and Lee, Charles A., to Cornell Research Foundation, Inc. Monolithic coplanar waveguide travelling wave transistor amplifier. 4,587,541, Cl. 357-22.000.
Daluge, Susan M.; and Skonezny, Paul M. 2,-diamino-(substituted-benzopyran(quinolyl,isoquinoly)methyl)pyrimidines useful as antibacterials. 4,587,342, Cl. 544-324.000.
Dance, William E.: *See*—
Carollo, Sammy F.; and Dance, William E., 4,587,555, Cl. 358-111.000.
Dane, Brian. Novelty advertising cap. 4,586,280, Cl. 40-329.000.
Danelson, Terry L.; and Harmon, Barry J. Drive assembly. 4,586,593, Cl. 192-67.00R.
Danfoss A/S: *See*—
Winter, Janos; and Lichtenberg, Jesper, 4,586,828, Cl. 374-16.000.
Dang, Alain Y.: *See*—
Mocquart, Jacques M.; and Dang, Alain Y., 4,586,529, Cl. 137-268.000.
Dangler, Paul E., to Eastman Kodak Company. Clock signal producing apparatus. 4,587,531, Cl. 346-108.000.
Daniel Industries: *See*—
McNeely, Michael D., 4,586,534, Cl. 137-515.700.
Daniel, Vernon T.: *See*—
Lassiter, B. Dean; Daniel, Vernon T.; and Sumner, John H., 4,586,323, Cl. 57-1.00R.
Danielisz, Miklos: *See*—
Harth, Hubert; Wuest, Willi; Bruhn, Hans-Athanas; Danielisz, Miklos; and Heinrich, Erbo, 4,587,059, Cl. 558-464.000.
Daniels, Phillip D. Recirculating bathtub. 4,586,204, Cl. 4-542.000.
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Takahashi, Akira; Danno, Yoshiaki; Iida, Kazumasa; and Iwata, Toshio, 4,586,475, Cl. 123-425.000.
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Bonnerot, Georges; and Daout, Michel, 4,587,498, Cl. 329-122.000.
Dapra, David J.; Clementi, John B.; and Morelli, Robert J., to Dapra, David J. Drill fixation device and method for vertebra cutting. 4,586,497, Cl. 128-92.00E.
Darden, Jerome W., to Texaco Inc. Non-silicate antifreeze formulations. 4,587,028, Cl. 252-76.000.
Datatape, Inc.: *See*—
Serafini, Joseph J., 4,587,581, Cl. 360-77.000.
Datta, Amitava: *See*—
Rabinkin, Anatol; and Datta, Amitava, 4,587,097, Cl. 420-473.000.
Davenport, John; and Russo, Michael A., to TI (Group Services) Limited. Controlling current density. 4,587,458, Cl. 315-111.010.
David R. Webb Co., Inc.: *See*—
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Davidson, Scott: *See—*
Smith, Francis S.; McIntosh, Bruce M.; Hayman, Nigel W.; and Davidson, Scott, 4,586,708, Cl. 273-73.00D.

Davies, Peter: *See—*
Ball, Kevin D.; and Davies, Peter, 4,587,658, Cl. 373-95.000.

Davies, Stephen P.; and Thompson, Morice W., to Imperial Chemical Industries PLC. Polymerization process using nonionic surfactant and copolymerizable unsaturated polyethylene glycol. 4,587,290, Cl. 524-558.000.

Davis, Gary C., to General Electric Company. Photopatternable dielectric compositions, method for making and use. 4,587,204, Cl. 430-325.000.

Davis, James A., to Rockwell International Corporation. Suppression of high-frequency acoustic waves in E-beam lasers. 4,587,657, Cl. 372-74.000.

Day, Diane I.; and Schuiling, Raymond R., to Sassy, Inc. Child's seat. 4,586,746, Cl. 297-174.000.

Day, Roger A.: *See—*
Allen, Gordon L.; Munro, Robert; and Day, Roger A., 4,586,553, Cl. 164-30.000.

Dayco Corporation: *See—*
Marsh, Richard L.; and Wetzel, Robert E., 4,586,973, Cl. 156-140.000.

Dean, Forrest S., administrator: *See—*
Wied, Julius P., deceased, 4,586,777, Cl. 339-154.00A.

Dean, John R.; and Bilson, Edward B., to FL Industries, Inc. Lighting fixture hinge assembly. 4,587,602, Cl. 362-375.000.

Dean, Sidney; and Butcher, John G., to USM Corporation. Blind riveting machine. 4,586,362, Cl. 72-391.000.

Dean, Sidney; and Butcher, John G., to USM Corporation. Blind riveting machine. 4,586,363, Cl. 72-391.000.

Dearman, Timothy C. Pipe clamps. 4,586,647, Cl. 228-49.300.

Deavenport, Joe E.: *See—*
Scolari, John E.; Warner, Robert T.; and Deavenport, Joe E., 4,586,715, Cl. 273-311.000.

DeBaun, David R.: *See—*
Currie, William S.; and DeBaun, David R., 4,587,642, Cl. 367-40.000.

Debras, Guy L. G.; De Clippeleir, Georges E. M. J.; and Cahen, Raymond M., to Labofina, S.A. Process for the isomerization of olefins. 4,587,375, Cl. 585-671.000.

De Clippeleir, Georges E. M. J.: *See—*
Debras, Guy L. G.; De Clippeleir, Georges E. M. J.; and Cahen, Raymond M., 4,587,375, Cl. 585-671.000.

deFaller, Joseph M.: *See—*
DeSantis, Louis M.; deFaller, Joseph M.; and York, Billie M., Jr., 4,587,257, Cl. 514-392.000.

Degenhardt, Heinz, to Siemens Aktiengesellschaft. X-ray image storage screen. 4,587,036, Cl. 252-301.40H.

DeGraff, Richard R., to UOP Inc. Aromatic hydrocarbon alkylation process product recovery method. 4,587,370, Cl. 585-450.000.

Degremont: *See—*
Adatto, Maurice; and Coste, Christian, 4,587,591, Cl. 361-235.000.

Deguchi, Takashi: *See—*
Kouyama, Kazumi; Deguchi, Takashi; Kadono, Masahiro; and Harada, Shigeki, 4,587,605, Cl. 363-41.000.

Delassus, Jean: *See—*
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Delonge, Jean-Claude L.: *See—*
Bouiller, Jean G.; and Delonge, Jean-Claude L., 4,586,225, Cl. 29-156.80R.

De Loof, Jean P., to Olaer Industries S.A. Manufacture of elastomeric bladders, particularly for pressure vessels. 4,587,074, Cl. 264-516.000.

DeLord, Ernest P. Air turning vane assembly. 4,586,540, Cl. 139-39.000.

DelPercio, Michael J.: *See—*
Holland, Charlie R.; and DelPercio, Michael J., 4,586,633, Cl. 221-257.000.

Demarne, Henri; and Hallot, Andre , to Sanofi. Method of treating neuropsychic disturbances by benzodiazepine derivatives and composition therefor. 4,587,245, Cl. 514-221.000.

de Medinaceli, Luis, to Cell Medical Corporation. Nerve connector and method. 4,586,504, Cl. 128-335.500.

Demuth, Hans, to Sulzer Brothers Limited. Return device for the projectile of a gripper projectile weaving machine. 4,586,542, Cl. 139-439.000.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Matsuda, Koichi; Tamaki, Shohei; Harada, Hiroshi; Nakashima, Masami; and Fujiyoshi, Makoto, 4,587,287, Cl. 524-404.000.

Denney, James R.; and Stehr, Robert L., to United States of America, Navy. Electronic assembly for moderate hard target penetrator fuze. 4,586,436, Cl. 102-206.000.

Denton, David A.: *See—*
Cairns, John F.; Denton, David A.; and Izzard, Patrick A., 4,587,001, Cl. 204-290.00R.

Denzel, Theodor: *See—*
Breuer, Hermann; Slusarchyk, William A.; Denzel, Theodor; and Treuner, Uwe D., 4,587,047, Cl. 260-239.00A.

Derby, Steven C., to Check-Strip Ltd. Method of and apparatus for facilitating the automatic processing of checks. 4,586,975, Cl. 156-191.000.

DeRespiris, Donald L.: *See—*
Carlson, Richard C.; DeRespiris, Donald L.; Sacco, Anthony R.; Groszek, Donald J.; and Ivancic, Bonnie M., 4,586,562, Cl. 165-134.100.

Derrien, Michel: *See—*
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DeSantis, Louis M.; deFaller, Joseph M.; and York, Billie M., Jr., to Alcon Laboratories, Inc. Control of ocular bleeding using clonidine derivatives. 4,587,257, Cl. 514-392.000.

Deschenaux, Warren: *See—*
Fiandra, Carlo L.; and Deschenaux, Warren, 4,586,787, Cl. 350-257.000.

deaJardins, Stephen R., to Ampex Corporation. Directional control for tape reel. 4,587,578, Cl. 360-74.100.

De Spain, James R.; and Burke, Michael W., to Carrier Vibrating Equipment, Inc. Method and apparatus for surface treating a workpiece. 4,586,293, Cl. 51-7.000.

Detlefsen, Robert E.: *See—*
Winter, Roland A. E.; and Detlefsen, Robert E., 4,587,346, Cl. 548-260.000.

Devecchi, Daniele: *See—*
Torelli, Guido; and Devecchi, Daniele, 4,587,441, Cl. 307-269.000.

de Vries, Coos, to U.S. Philips Corporation. Supervising arrangement. 4,587,515, Cl. 340-506.000.

Dewald, James R.: *See—*
Tomalia, Donald A.; and Dewald, James R., 4,587,329, Cl. 528-363.000.

Dibrell, Edwin W.; O'Neal, Glenn B.; and Schaich, Wilbur A., to Centrifugal Piston Expander, Inc. Multi-cylinder piston engine and method of operation thereof. 4,586,426, Cl. 91-176.000.

Dick, David A.: *See—*
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,587,075, Cl. 264-573.000.

Dick, Kevin F.: *See—*
Ogoe, Samual A.; and Dick, Kevin F., 4,587,310, Cl. 525-462.000.

Dicks, Karl-Heinz: *See—*
Kramer, Carl; and Dicks, Karl-Heinz, 4,586,946, Cl. 65-273.000.

Didier, Robert G., to BIW Cable Systems, Inc. Electrical connector for armored cables. 4,586,774, Cl. 339-94.00M.

Diener, Arnulf; Kettler, Hans; and Tenhaven, Ulrich, to Hoechst Aktiengesellschaft. Process for producing metallic coatings. 4,587,135, Cl. 427-13.000.

Diesel Kiki Co., Ltd.: *See—*
Kobayashi, Masayoshi; Nozaki, Shinya; Yamada, Keiichi; and Kobayashi, Tadashi, 4,586,480, Cl. 123-506.000.
Sakurai, Yoshihiko, 4,586,652, Cl. 236-13.000.

Dietrichs, Hans-Hermann, deceased: *See—*
Ayla, Cihan; Dietrichs, Hans-Hermann, deceased; Puls, Jurgen; and Sinner, Michael, 4,587,285, Cl. 524-78.000.

Dietrichs, Magda M. U., Daniel Dietrichs, Stephan Dietrichs, heirs: *See—*
Ayla, Cihan; Dietrichs, Hans-Hermann, deceased; Puls, Jurgen; and Sinner, Michael, 4,587,285, Cl. 524-78.000.

DiFoggio, Rocco, to Shell Oil Company. Downhole fracture analysis. 4,587,641, Cl. 367-30.000.

Digital Equipment Corporation: *See—*
Staples, James F., 4,587,595, Cl. 361-388.000.

DiGiulio, Edmond, to Cinema Products Corporation. Film to tape transfer system. 4,587,572, Cl. 360-14.300.

Dill, Frederick H.; Gupta, Satish; and Warter, Peter J., to International Business Machines Corporation. Random address memory with fast clear. 4,587,629, Cl. 364-900.000.

Di Lorenzo, Ralph N.: *See—*
Andres, Lewis B.; Esvang, Robert L.; and Di Lorenzo, Ralph N., 4,586,528, Cl. 137-202.000.

Dingler, Douglas W.; Gadsbey, James F.; and Crossman, Philip E., to Stow & Davis Furniture Company. Adjustable chair iron. 4,586,748, Cl. 297-300.000.

Di Pietro, Vincent. Toy blow gun. 4,586,482, Cl. 124-62.000.

Dirnberger, Linus R.; Husson, Alan L.; and Brick, Michael J., to Westinghouse Electric Corp. Elevator system with hall lamp status monitoring. 4,587,511, Cl. 340-19.00R.

Dischert, Robert A., to RCA Corporation. Television camera mechanical apparatus driven by recorder motor. 4,587,564, Cl. 358-213.000.

DiStefano, Thomas H.: *See—*
Cocke, John; and DiStefano, Thomas H., 4,587,579, Cl. 360-75.000.

DiTommaso, Anthony; Inglis, Ronald T.; Worley, Richard C.; and Renda, Ramon J., to General Dynamics Pomona Division. Spring-erected telescopic wing support structure. 4,586,680, Cl. 244-3.270.

Ditzel, David R., to AT&T Bell Laboratories. Lookahead stack oriented computer. 4,587,632, Cl. 364-900.000.

Divirgilio, Ralph F.: *See—*
Simmons, Thomas E.; Divirgilio, Ralph F.; and Innis, Charles L., Jr., 4,586,720, Cl. 277-152.000.

DM International Inc.: *See—*
Lutz, Irvin H.; and Chen, Jong J., 4,586,344, Cl. 62-101.000.

Do-huu, Jean-Paul; and Hartemann, Pierre, to Thomson-CSF. Device for localized heating of biological tissues. 4,586,512, Cl. 128-660.000.

Dobashi, Akihiko: *See—*
Ohta, Tomohisa; Dobashi, Akihiko; and Seki, Yasuyuki, 4,587,313, Cl. 526-75.000.

Doboy Packaging Machinery, Inc.: *See—*
Johnson, Gerald R., 4,586,412, Cl. 83-205.000.

Dobson Park Industries Plc: *See—*
Stafford, Raymond, 4,586,867, Cl. 414-723.000.

Doerschner, David L.: *See—*
Nystrom, Wilford O.; Riedel, Kenneth E.; and Doerschner, David L., 4,586,974, Cl. 156-165.000.

Dohi, Hiroyuki: *See*—
Nakamura, Shunichi; and Dohi, Hiroyuki, 4,587,569, Cl. 358-296.000.
Doki, Yoshikuni: *See*—
Tanaka, Mikio; Doki, Yoshikuni; Tsuruoka, Yoshihiro; Fujiwara, Masatoshi; and Shiga, Tatsuhide, 4,586,388, Cl. 73-862.580.
Doleschall, Gabor: *See*—
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.
Dompas, John M. A.: *See*—
Govaerts, Marcel K.; Gielen, Hendrik A. L.; and Dompas, John M. A., 4,586,559, Cl. 164-455.000.
Dong, Walter: *See*—
Colby, Thomas H.; and Dong, Walter, 4,587,060, Cl. 558-304.000.
Donovan, Mary B.: *See*—
Campbell, Douglas D.; and Donovan, Mary B., 4,587,148, Cl. 428-88.000.
Doornhein, Laurens; Raven, Johannes G.; Welles, Petrus W. G.; Annegarn, Marcellinus J. J. C.; and Nillesen, Antonius H. H. J., to U.S. Philips Corporation. Field number conversion circuit. 4,587,557, Cl. 358-140.000.
Doryokuro Kakunenryo Kaihatsu Jigyodan: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, 4,587,098, Cl. 422-7.000.
Doswald, Paul; Moriconi, Emil; Moser, Helmut; and Schmid, Horst, to Sandoz Ltd. Sulfo group-free azo compounds having on average at least 1.3 basic water-solubilizing groups in metal-free, 1:1 metal complex or 1:2 metal complex form. 4,587,292, Cl. 534-606.000.
Dotzauer, Bernhard; Kast, Hans; Franzmann, Gernot; Ley, Gregor; Beckerle, Wilhelm F.; and Schilder, Wolfgang, to BASF Aktiengesellschaft. Sound-insulating boards based on mineral fibers and thermoplastic binders. 4,587,278, Cl. 523-200.000.
Dougherty, Robert W., to Southco, Inc. Flush mounting cup for cabinet latch. 4,586,736, Cl. 292-202.000.
Dow Chemical Company, The: *See*—
Freeman, Thurman W., 4,587,164, Cl. 428-314.400.
Gerwick, B. Clifford, III, 4,586,949, Cl. 71-91.000.
Goldsmith, Charles E.; and Patterson, Thomas A., 4,586,999, Cl. 204-265.000.
Hammonds, James W.; and Wheeler, James E., 4,586,844, Cl. 403-287.000.
Hefner, Robert E., Jr., 4,587,293, Cl. 525-49.000.
Livingston, Dana A.; and Surls, Joseph P., Jr., 4,587,116, Cl. 423-415.00A.
Ogoe, Samual A.; and Dick, Kevin F., 4,587,310, Cl. 525-462.000.
Tomalia, Donald A.; and Dewald, James R., 4,587,329, Cl. 528-363.000.
Dow Corning Corporation: *See*—
Cornwall, Susan M.; and Homan, Gary R., 4,586,518, Cl. 132-7.000.
Gutek, Beth I.; and Van Wert, Bernard, 4,587,159, Cl. 428-251.000.
Maxson, Myron T.; and Schoenherr, Christine J., 4,587,288, Cl. 524-425.000.
Swihart, Terence J., 4,587,320, Cl. 528-23.000.
Dow Corning Ltd.: *See*—
White, James W.; and Griffiths, Brian J., 4,587,136, Cl. 427-54.100.
Dowell, Robert I.: *See*—
Brown, David; Dowell, Robert I.; Hargreaves, Rodney B.; and Main, Brian G., 4,587,246, Cl. 514-222.000.
Downs, Richard C.: *See*—
Grabbe, Dimitry G.; and Downs, Richard C., 4,587,548, Cl. 357-70.000.
Drake, Charles A.; and Reiter, Stephen E., to Phillips Petroleum Company. Catalyst for the production of allyl acetate. 4,587,229, Cl. 502-243.000.
Drake, Cyril F.; and Arch, Alfred J., to Standard Telephones and Cables, PLC. Controlled release system. 4,587,267, Cl. 514-769.000.
Drazin, Shepard; and Van Antwerp, William P., to GSP Metals & Chemicals Corporation. Chelating metals. 4,586,990, Cl. 204-44.400.
Dreibelbis, John D.; and Weilerstein, I. Marvin, to Kulicke and Soffa Industries Inc. Wire bond monitoring system. 4,586,642, Cl. 228-4.500.
Driam Metallprodukt GmbH & Co. KG: *See*—
Dunajtschik, Rudolf, 4,586,457, Cl. 118-19.000.
Driskell, William L.: *See*—
Minter, Mark A.; and Driskell, William L., 4,586,634, Cl. 222-3.000.
D'Silva, Arthur P.: *See*—
Rice, Gary; D'Silva, Arthur P.; and Fassel, Velmer A., 4,586,368, Cl. 73-23.100.
Dubbs, Jack F.; and Hanyen, Clyde K., to AMP Incorporated. Flexible strip of encapsulated contact members. 4,586,607, Cl. 206-329.000.
Dubrovsky, Evgeny V.; Averkiev, Leonid A.; and Martynova, Natalya I. Tube-and-plate heat exchanger. 4,586,563, Cl. 165-151.000.
Ducellier & Cie: *See*—
Savelli, Francis, 4,587,451, Cl. 310-208.000.
Dudley, Dwight A., II: *See*—
Halabisky, Donald D.; and Dudley, Dwight A., II, 4,586,643, Cl. 229-3.100.
Duffy, James J., to Ford Motor Company. Power steering system with vehicle speed-sensitive flow. 4,586,582, Cl. 180-142.000.
Dullemond, Dirk J.: *See*—
Kasperkovitz, Wolfdietrich G.; and Dullemond, Dirk J., 4,587,478, Cl. 323-316.000.
Duminy, Jacques, to Voith Turbo GmbH & Co. KG. Clutch assembly capable of being engaged by fluid pressure depending on centrifugal force. 4,586,594, Cl. 192-103.0FA.
Dunajtschik, Rudolf, to Driam Metallprodukt GmbH & Co. KG. Drum-equipped apparatus for the production of coated pills. 4,586,457, Cl. 118-19.000.
Duncan, Kenneth R., to Solid Controls, Inc. Microprocessor control system with a bit/byte memory array. 4,587,613, Cl. 364-200.000.
Dupin, William W.: *See*—
Barnes, Bruce E.; Dupin, William W.; and Kuhlemann, Bruce W., 4,586,928, Cl. 604-408.000.
Du Pont de Nemours, E. I., and Company: *See*—
Bennett, Allyn N., 4,587,199, Cl. 430-260.000.
Carcia, Peter F., 4,587,176, Cl. 428-611.000.
Cole, Paul M., 4,586,918, Cl. 494-20.000.
Coursen, David L.; and Heffner, James D., 4,586,438, Cl. 102-313.000.
Farnham, William B., 4,586,952, Cl. 71-92.000.
Pasteris, Robert J., 4,586,950, Cl. 71-92.000.
Durand, David, to Iannetta, Raymond, a part interest. Method of applying a dye image to a plastic member and the image bearing member thereby formed. 4,587,155, Cl. 428-195.000.
Durand, Richard R., Jr.: *See*—
Yang, Sze C.; and Durand, Richard R., Jr., 4,586,792, Cl. 350-357.000.
DuVall, Dale R., to Mead Corporation, The. Device for electrical variable magnification of document image. 4,587,621, Cl. 364-577.000.
Duvdevani, Ilan; Eckert, John A.; Schulz, Donald N.; and Kitano, Kissho, to Exxon Research and Engineering Co. Antimisting system for hydrocarbon fluids. 4,586,937, Cl. 44-62.000.
Duve, George; Waage, Harold; and Quick, Luther P., to Area Lighting Research, Inc. Field-adjustable power control arrangement and methods of controlling power and of adjusting the timing thereof. 4,587,417, Cl. 250-214.0AL.
Dyke, David E.: *See*—
Adams, Kenneth J.; and Dyke, David E., 4,586,977, Cl. 156-308.600.
Dyroff, David R.; and Chou, Yueting, to Monsanto Company. Polymeric acetal carboxylate compositions. 4,587,033, Cl. 524-405.000.
Dzioba, Donald L., to General Motors Corporation. Tandem pump assembly. 4,586,468, Cl. 123-198.00C.
E.C.H. Will (GmbH & Co.): *See*—
Wolf, Wolfram, 4,586,315, Cl. 53-447.000.
E. J. Brooks Company: *See*—
Swift, Allan W., 4,586,570, Cl. 169-75.000.
E. R. Squibb & Sons, Inc.: *See*—
Breuer, Hermann; Slusarchyk, William A.; Denzel, Theodor; and Treuner, Uwe D., 4,587,047, Cl. 260-239.00A.
Gordon, Eric M.; and Weller, Harold N., III, 4,587,234, Cl. 514-19.000.
Jensen, Ole R., 4,586,927, Cl. 604-342.000.
Koster, William H., 4,587,051, Cl. 260-239.00A.
E-Systems, Inc.: *See*—
Parsons, Kenneth M.; and Helms, Darrell L., 4,587,525, Cl. 343-821.000.
Easter, James M., II. Systemitized waste product separation and total utilization. 4,586,659, Cl. 241-24.000.
Easterby, Robert W.: *See*—
Anderson, Alan F.; and Easterby, Robert W., 4,587,571, Cl. 360-2.000.
Eastman Kodak Company: *See*—
Cooper, James L., 4,587,364, Cl. 568-451.000.
Dangler, Paul E., 4,587,531, Cl. 346-108.000.
Miller, John H., 4,587,587, Cl. 360-109.000.
Schutrum, Walter L.; and Braun, Hilarion, 4,587,527, Cl. 346-75.000.
Eaton Corporation: *See*—
Farley, Marvin, 4,587,433, Cl. 250-492.200.
Eaves, Robert R. Photographic slide assembly and projector. 4,586,798, Cl. 353-120.000.
Ebata, Kohshi: *See*—
Kaneko, Tamaki; Takahashi, Yasuhiro; Okuzawa, Tsugio; Nakamura, Isao; and Ebata, Kohshi, 4,586,812, Cl. 355-24.000.
Eck, Bertil, to Honeywell Inc. Electrical connector plug with a integral ejector. 4,586,768, Cl. 339-45.00M.
Eckberg, Richard P., to General Electric Company. Novel dual cure silicone compositions. 4,587,137, Cl. 427-54.100.
Eckenrode, Paul D.; and Eisenbrei, Richard P., to Microdot Inc. Guide ring for bottom pour ingot mould system. 4,586,556, Cl. 164-342.000.
Eckert, John A.: *See*—
Duvdevani, Ilan; Eckert, John A.; Schulz, Donald N.; and Kitano, Kissho, 4,586,937, Cl. 44-62.000.
Eckert, Ronald P., to Thomas A. Schutz Co., Inc. Eyeglass frame display. 4,586,619, Cl. 211-189.000.
Economics Laboratory, Inc.: *See*—
Casey, Sheryl K., 4,587,030, Cl. 252-92.000.
Ed. Geistlich Sohne AG fur Chemische Industrie: *See*—
Luissi, Heinz; and Geistlich, Peter, 4,587,284, Cl. 524-17.000.
Ed. Geistlich Sohne A.G. fur Chemische Industrie: *See*—
Pfirrmann, Rolf W., 4,587,268, Cl. 514-774.000.
Edakubo, Hiroo: *See*—
Takayama, Nobutoshi; Edakubo, Hiroo; and Takimoto, Hiroyuki, 4,587,580, Cl. 360-77.000.

Eden, Dayton D., to LTV Aerospace and Defense Company. Pressure sensitive film display having multiple gray levels. 4,587,565, Cl. 358-235.000.

Edgren, David; Wong, Patrick S. L.; and Theeuwes, Felix, to Alza Corporation. Medical device for delivering drug to pH environments greater than 3.5. 4,587,117, Cl. 424-15.000.

Edo Western Corporation: *See—*
Lapetina, Robert A.; and Brainard, Edward C., II, 4,586,452, Cl. 114-245.000.

Edwards, Alan T.; and Smith, Steven A., to Intelledex Incorporated; and Applied Materials, Inc., a part interest. Robotic gripper for disk-shaped objects. 4,586,743, Cl. 294-86.400.

Egan, Joseph P., Jr.: *See—*
Kilner, Peter H.; Egan, Joseph P., Jr.; Ceisel, Stephen G.; and Schammel, Wayne P., 4,587,350, Cl. 549-245.000.

Egyt Gyogyszervegyeszeti Gyar: *See—*
Budai, Zoltan; Benko, Pal; Ratz nee Simonek, Ildiko ; Rakoczy nee Pinter, Eva; Magyar, Karoly; Kelemen, Jozsef; and Mandi, Attila, 4,587,261, Cl. 514-542.000.

Ehemann, George M., Jr., to RCA Corporation. Method for determining the MTF of a viewing window. 4,586,817, Cl. 356-124.500.

Ehlscheid, Gunter; and Munsch, Klaus, to Winkler & Dunnebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG. Method and apparatus for delivering articles from a high-speed production machine. 4,586,598, Cl. 198-356.000.

Eisenbrei, Richard P.: *See—*
Eckenrode, Paul D.; and Eisenbrei, Richard P., 4,586,556, Cl. 164-342.000.

Eisenegger, Edwin. Impact grinding method and apparatus. 4,586,658, Cl. 241-19.000.

Ekman, Heinz. Electric water heating appliance. 4,587,401, Cl. 219-314.000.

Electronics Corporation of America: *See—*
Bala, John L.; McCarron, Michael; and Zapolin, Richard E., 4,587,590, Cl. 361-94.000.

Elfab Corp.: *See—*
Ammon, J. Preston; Kendall, Jerry A.; and Martens, John D., 4,586,254, Cl. 29-884.000.

Eli Lilly and Company: *See—*
Atkins, Randall K.; and Weigel, Leland O., 4,587,351, Cl. 549-333.000.
Booher, Richard N.; and Kornfeld, Edmund C., 4,587,336, Cl. 544-105.000.
Brennan, John; and Tao, Eddie V. P., 4,587,348, Cl. 548-378.000.
Cooper, Robin D. G.; Morin, John M., Jr.; and Peters, Lynn R., 4,587,053, Cl. 260-245.400.
Hershberger, Charles L., 4,587,218, Cl. 435-253.000.
Ryan, Charles W., 4,587,344, Cl. 548-205.000.

Elliott Turbomachinery Co., Inc.: *See—*
Hohlweg, William C.; and Condrac, Edward, 4,586,870, Cl. 415-1.000.

Ellis, Allan E.: *See—*
Johnson, Shepard D.; French, Andrew; Ellis, Allan E.; Hedrick, Dennis R.; and Helfenberger, Charles D., 4,586,837, Cl. 400-216.200.

Ellison, Jerel E.: *See—*
Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., 4,586,719, Cl. 277-41.000.

Eltech Systems Corporation: *See—*
Carlson, Richard C.; DeRespiris, Donald L.; Sacco, Anthony R.; Groszek, Donald J.; and Ivancic, Bonnie M., 4,586,562, Cl. 165-134.100.

Emmrich, Gerd: *See—*
Preusser, Gerhard; Schulze, Martin; Emmrich, Gerd; and Schneider, Hans-Christoph, 4,586,986, Cl. 203-22.000.

Emori, Shinji; and Watanabe, Yoshio, to Fujitsu Limited. Variable-threshold-type differential signal receiver. 4,587,444, Cl. 307-355.000.

Emuco Aktiengesellschaft fur Maschinenbau: *See—*
Henkelmann, Wigand, 4,586,365, Cl. 72-405.000.

Energy Conversion Devices, Inc.: *See—*
Nath, Prem; and Fischer, Bela, 4,586,988, Cl. 204-15.000.

Energy Innovations, Inc.: *See—*
Burrowes, David E.; Holmes, Alan W.; and Valentine, Daniel R., 4,587,513, Cl. 340-347.00P.

Engelhardt, Friedrich: *See—*
Hille, Martin; Friede, Wolfgang; Wittkus, Heinz; Engelhardt, Friedrich; and Riegel, Ulrich, 4,587,283, Cl. 524-3.000.

Engstrom, John G.; and Till, Robert A., Jr., to AT&T Technologies, Inc. Intrusion sensing device. 4,587,517, Cl. 340-542.000.

Equipements Automobiles Marshall: *See—*
Nguyen, Huu-Can, 4,586,473, Cl. 123-419.000.

Eriksson, Erik F. Apparatus for treating cellulose pulp with adjustable treating gap. 4,586,665, Cl. 241-259.200.

Erkki Niskanen Oy: *See—*
Niskanen, Erkki P., 4,586,538, Cl. 137-625.500.

Ermeto Armaturen GmbH: *See—*
Castrup, Rolf, 4,586,731, Cl. 285-4.000.

Espelage, Paul M.; Lippitt, David L.; and Nowak, James M., to General Electric Company. Control for bumpless transfer of an AC motor between a solid-state inverter and a supply mains. 4,587,474, Cl. 318-709.000.

Esplin, Gordon J., to British Columbia Research Council. Method of storing logs. 4,586,848. Cl. 405-60.500.

Esselte Pendaflex Corporation: *See—*
Volk, Heinrich, 4,586,432, Cl. 101-111.000.

Essex Group, Inc.: *See—*
Pali, Christopher, 4,586,415, Cl. 83-564.000.

Estes, Robert F., to Crosby Valve & Gage Company. Non-flowing modulating pilot operated relief valve. 4,586,533, Cl. 137-488.000.

Esvang, Robert L.: *See—*
Andres, Lewis B.; Esvang, Robert L.; and Di Lorenzo, Ralph N., 4,586,528, Cl. 137-202.000.

Ethicon, Inc.: *See—*
Bedi, James J.; Golden, Donald M.; and Transue, James A., 4,586,502, Cl. 128-334.00R.
Borysko, Emil, 4,587,202, Cl. 430-320.000.

Ethyl Corporation: *See—*
Peters, Bruce C., 4,587,374, Cl. 585-670.000.

Eto, Yoshiyuki: *See—*
Sawamura, Keiichi; Eto, Yoshiyuki; Mine, Junichi; and Masuda, Koji, 4,587,231, Cl. 502-304.000.

Evans, Christopher J.: *See—*
Barchas, Jack D.; Weber, Eckard; Evans, Christopher J.; Wei, E. T.; Chang, J. K.; Fuchs, Ingbert; and Mues, Gabriele, 4,587,233, Cl. 514-15.000.

Evans, John R.: *See—*
Arnould, Jean C.; Evans, John R.; Jones, Geraint; and Thomson, David S., 4,587,262, Cl. 514-548.000.

Evans, Michael P.: *See—*
Oda, Ronald L.; Beck, Jeffrey L.; Blubaugh, Robert M.; Harris, Gary R.; Shaw, Ricky L.; and Evans, Michael P., 4,586,852, Cl. 406-14.000.

Evans, Ronald W.: *See—*
Powderley, John; and Evans, Ronald W., 4,586,231, Cl. 29-416.000.

Everhardus, Roelof H.; Siebers, Theodorus J. H.; and Biermans, Martinus B. G. M., to Oce-Nederland, B.V. Copying process with patterned charge injection into charge transport layer. 4,587,193, Cl. 430-126.000.

Evertz, Egon; and Seybold, Rolf, to Evertz, Egon. One-piece, open-ended, water-cooled continuous casting mould and method of making the same. 4,586,557, Cl. 164-418.000.

Ewing, William D. Deformable label. 4,587,158, Cl. 428-219.000.

Extance, Philip: *See—*
Pitt, Gillies D.; and Extance, Philip, 4,587,509, Cl. 338-32.00H.

Exxon Research and Engineering Co.: *See—*
Blaser, Don E.; Chang, Bong H.; and Baker, Charles L., 4,587,010, Cl. 208-127.000.
Duvdevani, Ilan; Eckert, John A.; Schulz, Donald N.; and Kitano, Kissho, 4,586,937, Cl. 44-62.000.
Franco, Robert J.; Berkowitz, Barry J.; and Kaul, Bal K., 4,586,561, Cl. 165-1.000.
Habeeb, Jacob J., 4,587,062, Cl. 558-133.000.
Patel, Ramesh N.; and Mortenson, Leonard E., 4,587,216, Cl. 435-123.000.
Siskin, Michael; and Brons, Glen, 4,587,004, Cl. 208-429.000.
Siskin, Michael; and Brons, Glen, 4,587,005, Cl. 208-415.000.
Thaler, Warren A.; Brois, Stanley J.; and Ferrara, Francis N., 4,587,304, Cl. 525-285.000.
Wheelock, Kenneth S., 4,587,009, Cl. 208-111.000.

Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, to Richter Gedeon Vegyeszeti Gyar R.T. Indolo[2,3-a]quinolizine and indolo[2,3-g]cyclopent[a]indolizine derivatives, compositions and methods employing them for treating ulcers. 4,587,251, Cl. 514-281.000.

F.J.R. Industries, Inc.: *See—*
Hartman, John E.; Petrovich, Roger; and Bortnick, Frank, 4,586,688, Cl. 248-538.000.

F & O Electronic Systems GmbH & Co.: *See—*
Obstfelder, Gunther; Kreutze, Gerhard; and Luttig, Winfried, 4,587,411, Cl. 235-437.000.

Fag Kugelfischer Georg Schafer & Co.: *See—*
Spielmann, Norbert; Gussbacher, Udo; Walther, Wolfgang; and Bauer, Hermann, 4,586,580, Cl. 180-89.100.

Fah, Hansjakob, to Ciba-Geigy Corporation. Process for producing N-chlorosulfenyl compounds. 4,587,353, Cl. 549-470.000.

Fajeau, Maurice; and Croxatto, Sylvain, to Commissariat a l'Energie Atomique. System for the emergency cooling of a pressurized water nuclear reactor core. 4,587,079, Cl. 376-282.000.

Fakler, Lyle D.; and Kaith, Irving, to Rockwell International Corporation. Method for fabricating a small-orifice fuel injector. 4,586,226, Cl. 29-157.00R.

Falce, Louis R.; and Breeze, Glenn S., to Hughes Aircraft Company. Controlled porosity dispenser cathode. 4,587,455, Cl. 313-346.0DC.

Fanuc Ltd.: *See—*
Kishi, Hajimu; and Tanaka, Kunio, 4,587,608, Cl. 364-191.000.
Kurakake, Mitsuo, 4,587,607, Cl. 364-167.000.
Nakashima, Seiichiro; Inagaki, Shigemi; and Ito, Susumu, 4,586,868, Cl. 414-735.000.
Nihei, Ryo, 4,586,869, Cl. 414-736.000.

Farley, Marvin, to Eaton Corporation. Dose control apparatus. 4,587,433, Cl. 250-492.200.

Farnham, William B., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,586,952, Cl. 71-92.000.

Fassel, Velmer A.: *See—*
Rice, Gary; D'Silva, Arthur P.; and Fassel, Velmer A., 4,586,368, Cl. 73-23.100.

Faticanti, Robert L., to Avco Corporation. Tool for removing soldered components. 4,586,252, Cl. 29-762.000.

Fecker, Rainer: *See*—
Lehmann, Werner; Fecker, Rainer; and Markgraf, Wilhelm, 4,586,704, Cl. 270-46.000.
Fedder, James L.: *See*—
Cobaugh, Robert F.; Fedder, James L.; and Taylor, Attalee S., 4,586,772, Cl. 339-75.0MP.
Fegley, Charles R., to AT&T Bell Laboratories. Container for and method of enclosing an article. 4,586,608, Cl. 206-334.000.
Fekete, Gyorgy: *See*—
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.
Ferguson, Stewart. Two-course shingle panel. 4,586,309, Cl. 52-540.000.
Ferranti, PLC: *See*—
McPherson, Hugh, 4,587,594, Cl. 361-383.000.
Ferrara, Francis N.: *See*—
Thaler, Warren A.; Brois, Stanley J.; and Ferrara, Francis N., 4,587,304, Cl. 525-285.000.
Ferrio, Tom M.; and Gerwig, Floyd R., to Texas Instruments Incorporated. Data processing apparatus for multiple mode operation as specified by user inputs. 4,587,634, Cl. 364-900.000.
Ferro Corporation: *See*—
Williams, Charles F.; and Sahni, Atam P., 4,587,160, Cl. 428-288.000.
Fetter, Jozsef: *See*—
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.
Feutrel, Claude, to Commissariat a l'Energie Atomique. Nuclear reactor fuel assembly. 4,587,092, Cl. 376-438.000.
Fiandra, Carlo L.; and Deschenaux, Warren, to Perkin-Elmer Corporation, The. Lens assembly. 4,586,787, Cl. 350-257.000.
Fiberglas Canada Inc.: *See*—
Mena, Peter L., 4,587,282, Cl. 523-508.000.
Fichtel & Sachs AG: *See*—
Hartig, Franz; and Tomm, Dagwin, 4,586,595, Cl. 192-106.200.
Field, Martin J.; and Rosin, Donald A., to General Motors Corporation. Fuel rail assembly. 4,586,477, Cl. 123-468.000.
Fieldcrest Mills, Inc.: *See*—
Sella, Nancy W., 4,587,153, Cl. 428-196.000.
Fields, Robert D.: *See*—
Hotchkiss, Harry W.; Fields, Robert D.; and Rolsten, Gina K., 4,587,154, Cl. 428-195.000.
Fields, Stephen F.; and Krishnakumar, C. K., to General American Transportation Corporation. Ball valve purge device for tank cars. 4,586,547, Cl. 141-35.000.
Fiergolla, Ulrich; and Rottmayr, Josef. Prefabricated ceiling element for ceilings in buildings. 4,586,307, Cl. 52-334.000.
Figgie International, Inc.: *See*—
Puccinelli, Joseph S., 4,586,842, Cl. 403-246.000.
Finley, Charles M.: *See*—
Rhoades, Rex V.; and Finley, Charles M., 4,587,479, Cl. 324-65.0CR.
Finnegan, Robert J.: *See*—
Prescott, Keith L.; and Finnegan, Robert J., 4,586,638, Cl. 224-329.000.
Finnegan, Walter D.; and Woods, Ralph A. A., to Kaiser Aluminum & Chemical Corporation. Corrosion resistant vacuum brazing sheet. 4,586,964, Cl. 148-11.50A.
Finney, James A., Jr.; and Gallo, Frank, to Foster Wheeler Energy Corporation. Modulated power supply for an electrostatic precipitator. 4,587,475, Cl. 323-241.000.
Fisch, Richard S., to Minnesota Mining and Manufacturing Company. Dye transfer image process. 4,587,198, Cl. 430-201.000.
Fischer, Bela: *See*—
Nath, Prem; and Fischer, Bela, 4,586,988, Cl. 204-15.000.
Fischer, Franz-Josef: *See*—
Sartor, Bruno; Huftle, Jurgen; Strasmann, Burkhart; and Fischer, Franz-Josef, 4,586,224, Cl. 29-121.200.
Fischer, Michael: *See*—
Schmid, Rolf; Zondler, Helmut; Fischer, Michael; and Stauffer, Werner, 4,587,311, Cl. 525-504.000.
Fisk, Dale E.; Griffith, Robert L.; Homan, Merle E.; Radin, George; and Richards, Waldo J., to International Business Machines Corporation. Accelerated instruction mapping external to source and target instruction streams for near realtime injection into the latter. 4,587,612, Cl. 364-200.000.
FL Industries, Inc.: *See*—
Dean, John R.; and Bilson, Edward B., 4,587,602, Cl. 362-375.000.
Flamand, Robert. Insulated siding and method for its application. 4,586,304, Cl. 52-309.800.
Fleischer, Johann: *See*—
Schondorfer, Georg; Fleischer, Johann; Stocker, Manfred; and Korber, Gunther, 4,586,823, Cl. 366-3.000.
Fleissner, Heinz, to Vepa Aktiengesellschaft. Heat treatment tunnel. 4,586,268, Cl. 34-68.000.
Flessner, Theodor: *See*—
Foller, Werner; Lingnau, Josef; and Flessner, Theodor, 4,586,653, Cl. 236-48.00R.
Fletcher, Ian J.: *See*—
Bedekovic, Davor; and Fletcher, Ian J., 4,587,343, Cl. 546-116.000.
Bedekovic, Davor; and Fletcher, Ian J., 4,587,539, Cl. 346-220.000.
Florander, Nils-Ake, to Gotaverken Arendal AB. Means for mounting a thruster propeller unit. 4,586,907, Cl. 440-49.000.
Foerster, Charles E., Jr.: *See*—
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.
Fogg, James L.: *See*—
Ahmed, Hassan J.; and Fogg, James L., 4,587,407, Cl. 235-467.000.
Foller, Werner; Lingnau, Josef; and Flessner, Theodor, to GESTRA-KSB Vertriebsgesellschaft mbH & Co. Kommanditgesellschaft. Discharge device for a condensate controlled by a bimetallic snap disc. 4,586,653, Cl. 236-48.00R.
Foller, Werner; and Klann, Holm, to GESTRA Aktiengesellschaft. Steam trap with thermal control element and method of assembling said trap. 4,586,655, Cl. 236-56.000.
Ford Motor Company: *See*—
Duffy, James J., 4,586,582, Cl. 180-142.000.
Foreman, Donald: *See*—
Catallo, Frank; and Foreman, Donald, 4,586,222, Cl. 26-51.300.
Forster, Helmut. Gaiter for gravity relieving apparatus. 4,586,272, Cl. 36-2.00R.
Fort Recovery Industries, Inc.: *See*—
Westgerdes, James J., 4,586,203, Cl. 4-287.000.
Forward, Cleve H.; Butler, James R.; and Licht, William P., to Cosden Technology, Inc. Hydrocarbon conversion of sulfur contaminated feed stock. 4,587,371, Cl. 585-467.000.
Forward, Ross M. Inflatable balloon distress marker having small article containing compartment therein. 4,586,456, Cl. 116-210.000.
Foster Wheeler Energy Corporation: *See*—
Finney, James A., Jr.; and Gallo, Frank, 4,587,475, Cl. 323-241.000.
Fourneaux, Roger: *See*—
Volland, Michel; Fourneaux, Roger; and Remond, Pierre, 4,586,543, Cl. 139-452.000.
Fox, Larry D., to Cummins Engine Company, Inc. Turbocompound system. 4,586,337, Cl. 60-605.000.
Fox, Michael. Food processor. 4,586,666, Cl. 241-282.200.
Framatome & Cie: *See*—
Bonhomme, Nicolaas, 4,587,076, Cl. 376-203.000.
Franco, Robert J.; Berkowitz, Barry J.; and Kaul, Bal K., to Exxon Research and Engineering Co. Low temperature heat pipe employing a hydrogen getter. 4,586,561, Cl. 165-1.000.
Frank, Gerhard; and Neubauer, Gerald, to BASF Aktiengesellschaft. Molded iron catalyst material and its preparation. 4,587,228, Cl. 502-185.000.
Franzmann, Gernot: *See*—
Dotzauer, Bernhard; Kast, Hans; Franzmann, Gernot; Ley, Gregor; Beckerle, Wilhelm F.; and Schilder, Wolfgang, 4,587,278, Cl. 523-200.000.
Frederickson, James R.; Harper, William H.; and Perez, Raymond, to United States of America, Energy. Latch assembly. 4,586,740, Cl. 294-1.100.
Freeman, Thurman W., to Dow Chemical Company, The. Roof deck composite panels. 4,587,164, Cl. 428-314.400.
French, Andrew: *See*—
Johnson, Shepard D.; French, Andrew; Ellis, Allan E.; Hedrick, Dennis R.; and Helfenberger, Charles D., 4,586,837, Cl. 400-216.200.
Freyssinet International: *See*—
Jartoux, Pierre; and Brondeau, Christian, 4,586,303, Cl. 52-309.160.
Friberg, Svend; Korsgaard, Peter; and Worsoe-Schmidt, Peder, to Kaptan APS. Solar energy powered system for the production of cold. 4,586,345, Cl. 62-235.100.
Friede, Wolfgang: *See*—
Hille, Martin; Friede, Wolfgang; Wittkus, Heinz; Engelhardt, Friedrich; and Riegel, Ulrich, 4,587,283, Cl. 524-3.000.
Fritsch, Rudolf P.: *See*—
Blach, Josef A.; and Fritsch, Rudolf P., 4,586,219, Cl. 74-410.000.
Fritschi, Edgar: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Fritschi, Edgar; and Vigelius, Wolf-Dieter, 4,587,263, Cl. 514-553.000.
Fritz Gegauf AG Bernina-Nahmaschinenfabrik: *See*—
Lerch, Hansueli; and Stillhard, Otmar, 4,586,448, Cl. 112-275.000.
Fritz-Werner Industrie-Ausruestungen GmbH: *See*—
Ayla, Cihan; Dietrichs, Hans-Hermann, deceased; Puls, Jurgen; and Sinner, Michael, 4,587,285, Cl. 524-78.000.
Frosien, Jurgen: *See*—
Lischke, Burkhard; Frosien, Jurgen; and Schmitt, Reinhold, 4,587,481, Cl. 324-73.0PC.
Frou, Pascal; and Krausener, Gilbert, to Institut de Recherches de la Siderurgie Francaise (IRSID). Process and apparatus for preventing dissymmetry in rolled beams. 4,586,356, Cl. 72-8.000.
Fry, Stanley B.: *See*—
Wang, An; Fry, Stanley B.; Ho, Shu K.; and Smutek, John M., 4,587,633, Cl. 364-900.000.
Fuchs, Ingbert: *See*—
Barchas, Jack D.; Weber, Eckard; Evans, Christopher J.; Wei, E. T.; Chang, J. K.; Fuchs, Ingbert; and Mues, Gabriele, 4,587,233, Cl. 514-15.000.
Fugazza, Ermanno; and Dal Poz, Giuseppe, to A.M.S.E.A. - Azienda Meccanica Stampaggi e Attrezzature S.p.A. Mechanical starter for internal combustion engines. 4,586,466, Cl. 123-179.00S.
Fuji Fire-Proof Material Industry Co., Ltd.: *See*—
Matsuura, Sadaji; Arai, Yasuo; Aoki, Shigeki; and Ando, Satoru, 4,586,958, Cl. 106-15.050.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Takahashi, Toshio, 4,587,615, Cl. 364-431.110.

Yamakawa, Toru; Makita, Fujio; Umezawa, Mitsuo; and Sakakiyama, Ryuzo, 4,586,583, Cl. 180-247.000.

Fuji Photo Film Co., Ltd.: *See*—
Akao, Mutsuo, 4,587,175, Cl. 428-596.000.
Amano, Yoshikazu; Arai, Fuminori; and Kitajima, Masao, 4,587,100, Cl. 422-56.000.
Hanai, Kazuko; Yoneyama, Takashi; and Ito, Toshihisa, 4,587,170, Cl. 428-425.900.
Hoshino, Fumio; and Mochizuki, Yasuyoshi, 4,586,815, Cl. 355-76.000.
Nagatomo, Shigeru; Yasuda, Yukio; Masuda, Nobuhito; Makiuchi, Hajime; and Okazaki, Masaki, 4,587,102, Cl. 422-56.000.
Nishizawa, Tetuo; Asano, Seiji; Ishiguro, Minoru; Komori, Masanoshin; Tobioka, Takashi; Yoshida, Toshio; and Hara, Hiroshi, 4,586,801, Cl. 354-173.100.
Noguchi, Masaru; and Ohga, Akihiro, 4,587,420, Cl. 250-235.000.
Ono, Michio; Morigaki, Masakazu; Kamio, Takayoshi; Aoki, Kozo; and Furuya, Kazuhiko, 4,587,210, Cl. 430-555.000.
Sakaguchi, Yukihiko; Aono, Toshiaki; and Fujita, Shinsaku, 4,587,206, Cl. 430-348.000.
Tamoto, Koji; and Umehara, Akira, 4,587,200, Cl. 430-281.000.
Tsuda, Momotoshi; and Arakawa, Jun, 4,587,207, Cl. 430-389.000.

Fuji Xerox Co., Ltd.: *See*—
Hamano, Toshihisa; Nakamura, Takeshi; and Fuse, Mario, 4,587,171, Cl. 428-448.000.
Noguchi, Akio, 4,587,530, Cl. 346-76.0PH.

Fujie, Masakatsu: *See*—
Hosoda, Yuji; Kojima, Yoshio; Fujie, Masakatsu; Honma, Kazuo; Iwamoto, Taro; Nakano, Yoshiyuki; and Kamejima, Kohji, 4,586,335, Cl. 60-528.000.

Fujiie, Kazuhiko, to Sony Corporation. Tracking servocontrol circuits for reducing gain to avoid tracking defect in an optical reproducing apparatus. 4,587,644, Cl. 369-44.000.

Fujimura, Takashi: *See*—
Hayashi, Nobuyasu; and Fujimura, Takashi, 4,586,799, Cl. 354-1.000.

Fujino, Akihiko: *See*—
Tominaga, Shinji; Nakai, Masaaki; Inoue, Norihiro; Fujino, Akihiko; Inoue, Manabu; and Taniguchi, Nobuyuki, 4,586,800, Cl. 354-21.000.

Fujioka, Kazumasa: *See*—
Higeta, Kazuya; Fujioka, Kazumasa; Nemoto, Takeo; Daikoku, Takahiro; and Nakajima, Isao, 4,587,399, Cl. 219-216.000.

Fujita, Shinsaku: *See*—
Sakaguchi, Yukihiko; Aono, Toshiaki; and Fujita, Shinsaku, 4,587,206, Cl. 430-348.000.

Fujitsu Limited: *See*—
Aoyama, Keizo; Seki, Teruo; and Yamauchi, Takahiko, 4,587,639, Cl. 365-200.000.
Emori, Shinji; and Watanabe, Yoshio, 4,587,444, Cl. 307-355.000.
Matsumoto, Toshio; and Kato, Motokazu, 4,587,654, Cl. 371-14.000.

Fujiwara, Kouichi: *See*—
Kishimoto, Munehisa; Sakata, Noboru; Kimura, Miyoshi; Fujiwara, Kouichi; and Komura, Hidekazu, 4,586,789, Cl. 350-336.000.

Fujiwara, Kouji: *See*—
Kinoshita, Hiromi; Fujiwara, Kouji; and Maeda, Yoshinobu, 4,586,251, Cl. 29-741.000.

Fujiwara, Masatoshi: *See*—
Tanaka, Mikio; Doki, Yoshikuni; Tsuruoka, Yoshihiro; Fujiwara, Masatoshi; and Shiga, Tatsuhide, 4,586,388, Cl. 73-862.580.

Fujiyama, Hisanori: *See*—
Souchi, Toshiyuki; Fujiyama, Hisanori; and Hagi, Mitsuo, 4,586,253, Cl. 29-796.000.

Fujiyoshi, Makoto: *See*—
Matsuda, Koichi; Tamaki, Shohei; Harada, Hiroshi; Nakashima, Masami; and Fujiyoshi, Makoto, 4,587,287, Cl. 524-404.000.

Fukakusa, Shinji: *See*—
Tomoda, Toshimasa; Fukakusa, Shinji; and Yamashita, Shinichi, 4,587,429, Cl. 250-375.000.

Fukuchi, Hisashi; Inui, Masaki; and Iwata, Hideyuki, to Toyota Jidosha Kabushiki Kaisha. Lubrication device in transmission unit for automotive vehicles. 4,586,395, Cl. 74-467.000.

Fukuda, Tsuguo: *See*—
Katsumata, Tooru; Terashima, Kazutaka; Nakajima, Hiroaki; and Fukuda, Tsuguo, 4,586,979, Cl. 156-601.000.

Fukuoka, Shinsuke; and Watanabe, Tomonari, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for producing an aliphatic isocyanate. 4,587,056, Cl. 260-453.0PC.

Fukuzuka, Toshio: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, 4,587,098, Cl. 422-7.000.

Fulkerson, Terrence M.: *See*—
Hollstein, Thomas E.; Herrig, Robert A.; Fulkerson, Terrence M.; and Sharpless, John, 4,586,386, Cl. 73-861.040.

Fulier, John F., Jr., to H. J. Heinz Company. Process for the drying of fruits. 4,587,132, Cl. 426-640.000.

Funabashi, Kiyomi: *See*—
Kawamura, Fumio; Kikuchi, Makoto; and Funabashi, Kiyomi, 4,587,232, Cl. 502-400.000.

Funakoshi, Satoshi: *See*—
Ueda, Yasuo; Shiraga, Yusei; Morimoto, Satoshi; Kagitani, Yoshio; Funakoshi, Satoshi; and Suyama, Tadakazu, 4,587,052, Cl. 260-239.30T.

Furuhashi, Toshiro: *See*—
Hara, Mitsunori; Yoshihira, Yukiteru; and Furuhashi, Toshiro, 4,587,180, Cl. 429-8.000.

Furukawa, Heizaburo: *See*—
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.

Furukawa Kogyo Co., Ltd.: *See*—
Takai, Takao; Okada, Fumio; Odawara, Hiroyoshi; and Mitogawa, Fukumatsu, 4,586,320, Cl. 53-512.000.

Furukawa Mfg. Co., Ltd.: *See*—
Takai, Takao; Okada, Fumio; Odawara, Hiroyoshi; and Mitogawa, Fukumatsu, 4,586,320, Cl. 53-512.000.

Furukawa, Shinichi: *See*—
Noguchi, Matsusaburo; Yamamoto, Mikio; and Furukawa, Shinichi, 4,586,461, Cl. 118-663.000.

Furukawa, Shunsuke: *See*—
Monen, Marinus J. B. M.; Furukawa, Shunsuke; and Furuya, Tsuneo, 4,587,643, Cl. 369-32.000.

Furuya, Kazuhiko: *See*—
Ono, Michio; Morigaki, Masakazu; Kamio, Takayoshi; Aoki, Kozo; and Furuya, Kazuhiko, 4,587,210, Cl. 430-555.000.

Furuya, Tsuneo: *See*—
Monen, Marinus J. B. M.; Furukawa, Shunsuke; and Furuya, Tsuneo, 4,587,643, Cl. 369-32.000.

Fuse, Mario: *See*—
Hamano, Toshihisa; Nakamura, Takeshi; and Fuse, Mario, 4,587,171, Cl. 428-448.000.

Fuse, Motomasa: *See*—
Takeda, Renzo; Miki, Kazuyoshi; Ohga, Yukiharu; Fuse, Motomasa; Hiramoto, Kazuo; and Aoyama, Motoo, 4,587,089, Cl. 376-428.000.

Futamase, Tsuyoshi: *See*—
Kato, Mitsumi; and Futamase, Tsuyoshi, 4,586,417, Cl. 84-1.170.

Futures C, Inc.: *See*—
Clark, Harold E., 4,587,191, Cl. 430-97.000.

Gabbert, James D.: *See*—
Garner, Albert Y.; Gabbert, James D.; and Hedrick, Ross M., 4,587,305, Cl. 525-331.900.

Gadsbey, James F.: *See*—
Dingler, Douglas W.; Gadsbey, James F.; and Crossman, Philip E., 4,586,748, Cl. 297-300.000.

GAF Corporation: *See*—
Barabas, Eugene S., 4,586,962, Cl. 134-4.000.

Galipag: *See*—
Gasser, Hermann, 4,586,212, Cl. 15-256.510.

Gallaher Limited: *See*—
Sumner, Leslie, 4,586,883, Cl. 417-477.000.

Gallo, Frank: *See*—
Finney, James A., Jr.; and Gallo, Frank, 4,587,475, Cl. 323-241.000.

Gambro Lundia AB: *See*—
Carlsson, Per-Olov A. V.; and Karlberg, Rolf E., 4,586,925, Cl. 604-251.000.
Claren, Jan S.; and Olsson, Lars-Goran, 4,587,219, Cl. 435-288.000.

Gandolfo, Paul J., to Thomas & Betts Corporation. Wire marker sleeve and assembly. 4,586,610, Cl. 206-485.000.

Ganguly, Ashit K.: *See*—
Girijavallabhan, Viyyoor M.; Ganguly, Ashit K.; and Versace, Richard W., 4,587,241, Cl. 514-192.000.

GAO Gesellschaft fur Automation und Organisation mbH: *See*—
Hoppe, Joachim; and Haghiri-Tehrani, Yahya, 4,587,413, Cl. 235-492.000.

Garcia, George L.: *See*—
Johnston, Damon A.; and Garcia, George L., 4,586,676, Cl. 242-86.000.

Gardziella, Arno; Schwieger, Karl-Heinz; Adolphs, Peter; and Grossmann, Gerhard, to Rutgerswerke Aktiengesellschaft. Multicomponent aqueous resole binder with extended processability time. 4,587,291, Cl. 524-595.000.

Garner, Albert Y.; Gabbert, James D.; and Hedrick, Ross M., to Monsanto Company. Composition for use in preparing nylon block copolymer. 4,587,305, Cl. 525-331.900.

Garrett, Ernest, to Top Notcher Enterprises, Inc. Single use beverage container top. 4,586,625, Cl. 220-266.000.

Garrison, Marvin C., to Ampex Corporation. Plated magnetic recording material and process for making same. 4,587,166, Cl. 428-336.000.

Garry, Patrick J.: *See*—
Lenkoff, Leon G.; Lenkoff, Roger J.; and Garry, Patrick J., 4,586,714, Cl. 273-157.00R.

Gasser, Hermann, to Galipag. Cylinder wiping blade system. 4,586,212, Cl. 15-256.510.

Gasser, Robert A., Jr.: *See*—
Yau, Leopoldo D.; Gasser, Robert A., Jr.; Week, Kenneth R., Jr.; Yu, Jick M.; and Chin, David D., 4,587,138, Cl. 427-88.000.

Gates, Stillman F.: *See*—
Nelson, Gary A.; Godding, Patrick N.; Schumaker, Richard E.; Walter, Keith D.; Marrone, Edward S.; Gates, Stillman F.; Rigsbee, Everett O., III; and Teener, Michael D., 4,587,651, Cl. 370-88.000.

Gauthier, Pierre, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process and plant for the cooling of a fluid and in particular the liquefaction of natural gas. 4,586,942, Cl. 62-28.000.

Gautier, Jean-Claude: *See—*
Sturtz, Georges; Pensec, Thierry; and Gautier, Jean-Claude, 4,587,034, Cl. 252-184.000.
Gean Agricultural Manufacturing Ltd.: *See—*
Schultz, George, 4,586,459, Cl. 118-303.000.
Gebhard, Helmut: *See—*
Munstedt, Helmut; Gebhard, Helmut; Naarmann, Herbert; and Schlag, Johannes, 4,587,037, Cl. 252-500.000.
Geigert, John; and Neidleman, Saul L., to Cetus Corporation. Vicinal heterogeneous dihalogenated products and method. 4,587,217, Cl. 435-155.000.
Geistlich, Peter: *See—*
Luissi, Heinz; and Geistlich, Peter, 4,587,284, Cl. 524-17.000.
Gellert, Jobst U. Injection molding nozzle probe and stack molding apparatus. 4,586,887, Cl. 425-144.000.
General American Transportation Corporation: *See—*
Fields, Stephen F.; and Krishnakumar, C. K., 4,586,547, Cl. 141-35.000.
General Dynamics Pomona Division: *See—*
DiTommaso, Anthony; Inglis, Ronald T.; Worley, Richard C.; and Renda, Ramon J., 4,586,680, Cl. 244-3.270.
Redman, Paul G.; and Speicher, John M., 4,586,425, Cl. 91-45.000.
Wedertz, Larry D.; Leslie, David L.; and Karish, John A., 4,586,681, Cl. 244-49.000.
General Electric Company: *See—*
Avakian, Roger W.; and Jodice, Ronald E., 4,587,272, Cl. 521-86.000.
Davis, Gary C., 4,587,204, Cl. 430-325.000.
Eckberg, Richard P., 4,587,137, Cl. 427-54.100.
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Giles, Harold F., Jr., 4,587,299, Cl. 525-92.000.
Haitko, Deborah A., 4,587,327, Cl. 528-215.000.
Kim, Bang M., 4,587,112, Cl. 423-242.000.
Lee, Chung J., 4,586,997, Cl. 525-426.000.
Magoon, Inder K., 4,586,422, Cl. 89-7.000.
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Miller, Kenneth F., 4,587,298, Cl. 525-67.000.
Muller, Alexander, 4,586,244, Cl. 29-598.000.
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Rodenbeck, Philip G., 4,586,667, Cl. 242-7.030.
Rosenquist, Niles R., 4,587,326, Cl. 528-176.000.
Wehrli, Felix W., 4,587,489, Cl. 324-309.000.
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Cheetham, Robert, 4,587,381, Cl. 179-18.0FH.
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Grenier, Wilfred J., 4,586,734, Cl. 285-340.000.
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Arlauskas, Alfonsas, 4,586,737, Cl. 292-216.000.
Auman, John T.; Luyckx, Robert R.; Singh, Harmahendar; and Stockton, Thomas W., 4,586,584, Cl. 180-271.000.
Butler, Gary M.; and Bakewicz, Frank J., 4,586,738, Cl. 293-107.000.
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Field, Martin J.; and Rosin, Donald A., 4,586,477, Cl. 123-468.000.
Gresley, Ross A.; Leech, Howard E.; and Smock, Alan L., 4,586,245, Cl. 29-602.00R.
Juechter, Tadge J., 4,586,290, Cl. 49-348.000.
Karmel, Amir, 4,586,536, Cl. 137-599.000.
Lee, David N.; and Ballantyne, David B., 4,586,355, Cl. 70-455.000.
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Nestor, Charles R.; and Plyler, Robert G., 4,586,775, Cl. 339-97.00R.
Raver, Louis J., 4,586,467, Cl. 123-179.00B.
Rishel, Paul E.; LaGrou, Allan D.; and Seefried, Thomas E., 4,586,590, Cl. 188-345.000.
Weaver, John R., II; and McClure, Nathaniel D., 4,586,243, Cl. 29-578.000.
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Gerding, Gary H. Photographic paper handling device and method. 4,586,804, Cl. 354-322.000.
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Foller, Werner; Lingnau, Josef; and Flessner, Theodor, 4,586,653, Cl. 236-48.00R.
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Vincent, James H.; Mark, David; Gibson, Harold; and Lynch, Gordon, 4,586,389, Cl. 73-863.220.
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Giles, Harold F., Jr.; and Hirt, Robert P., Jr., to General Electric Company. Polycarbonate composition. 4,587,295, Cl. 525-57.000.
Giles, Harold F., Jr., to General Electric Company. Polyetherimide blends. 4,587,299, Cl. 525-92.000.
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Jacobson, Chester F., 4,586,255, Cl. 30-41.000.
Gillette, Richard J., to McDonnell Douglas Corporation. Speech compression. 4,587,669, Cl. 381-32.000.
Ginther, Vern, to Ver-Nor Development Corporation. Container pail opener. 4,586,404, Cl. 81-3.570.
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Girijavallabhan, Viyyoor M.; Ganguly, Ashit K.; and Versace, Richard W., to Schering Corporation. Heterocyclic substituted penems. 4,587,241, Cl. 514-192.000.
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Glynn, Michael H., to Sabre Safety Limited. Breathing apparatus. 4,586,500, Cl. 128-204.150.
Gockel, Karl-Heinz: *See—*
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Godinet, Wayne P. Cup stacking game apparatus. 4,586,709, Cl. 273-86.00R.
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Goldberg, Newton N., to Westinghouse Electric Corp. Fire retardant water repellent impregnating resins. 4,587,328, Cl. 528-299.000.
Golden, Donald M.: *See—*
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Goldenberg, Philip H.; Neuf, George J.; and Kirchner, Edward C., to Beloit Corporation. Flexible spoke rotor for multiple disk refiner. 4,586,662, Cl. 241-102.000.
Goldman, Stuart O., to ITT Corporation. Data control for telephone system. 4,587,652, Cl. 370-110.100.
Goldner, Erwin P. Plastic pipe chamfering tool. 4,586,408, Cl. 82-4.00C.
Goldsmith, Charles E.; and Patterson, Thomas A., to Dow Chemical Company, The. Three layer carbon based electrode. 4,586,999, Cl. 204-265.000.
Goldstein, Richard, to Perma Power Electronics, Inc. Power line transient surge suppressor. 4,587,588, Cl. 361-54.000.
Golubev, Evgeny K.; Lensky, Alexandr R.; Glazov, Evgeny E.; Berseniev, Vladimir A.; Vakulenko, Boris F.; Mikhailov, Vasily S.; and Shiryaev, Anatoly A., to Vsesojuzny Nauchno-Issledovatelsky Proektno-Konstruktorsky Institut Atomnogo Energeticheskogo Mashinostroenia. Method of continuous decontamination of radiocontaminated liquids by distillation. 4,586,981, Cl. 159-47.100.
Goodman, Charles J. Therapy table. 4,586,493, Cl. 128-57.000.
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Choate, Bruce T.; and Houck, Richard C., 4,586,234, Cl. 29-430.000.
Hsu, Wen-Liang, 4,587,372, Cl. 585-606.000.
Gordon, Eric M.; and Weller, Harold N., III, to E. R. Squibb & Sons, Inc. Carboxy and substituted carboxy alkanoyl and cycloalkanoyl peptides. 4,587,234, Cl. 514-19.000.
Gordon, William E.: *See—*
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Gould, Sheldon D.; and Riggs, Gary T., to Cordis Corporation. Curving tip catheter. 4,586,923, Cl. 604-95.000.
Govaerts, Marcel K.; Gielen, Hendrik A. L.; and Dompas, John M. A., to Hazelett Strip-Casting Corporation. Process and apparatus for casting a strip with laterally extending lugs. 4,586,559, Cl. 164-455.000.
Grabbe, Dimitry G.; and Downs, Richard C., to AMP Incorporated. Lead frame with fusible links. 4,587,548, Cl. 357-70.000.
Grafoplast s.a.s.: *See—*
Piana, Ivana; and Piana, Silvano, 4,586,671, Cl. 242-55.530.
Graham, Robert. Tone arm assembly. 4,587,646, Cl. 369-248.000.
Grajoszex, Jean. Device for stunning animals intended for slaughter by electric discharge. 4,586,216, Cl. 17-1.00E.
Grappendorf, Richard H., to Norton Christensen, Inc. Cutter configuration for a gage-to-shoulder transition and face pattern. 4,586,574, Cl. 175-329.000.
Grau, James A., to Schlumberger Technology Corporation. Method for investigating the composition of an earth formation traversed by a borehole. 4,587,424, Cl. 250-270.000.
Gravelle, Larry D.: *See—*
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Gray, Joseph H., to TRW Inc. Sum and difference conjugate discrete Fourier transform. 4,587,626, Cl. 364-726.000.
Gray, Keith I., to Golden Gate Switchboard Co. Vacuum circuit breaker. 4,587,390, Cl. 200-153.0SC.
Gray, Randall C.; and Joseph, Eric D., to Motorola, Inc. Current threshold detector. 4,587,442, Cl. 307-350.000.
Green Cross Corporation, The: *See—*
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Greenberg, Richard N., to St. Louis University. Inhibition of diarrhea induced by *Escherichia coli* heat-stable enterotoxin. 4,587,265, Cl. 514-562.000.
Grenier, Wilfred J., to General Industries, Inc. Pipe joint assembly. 4,586,734, Cl. 285-340.000.
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Groff, James W. Computer-assisted audio/visual teaching system. 4,586,905, Cl. 434-307.000.
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GTE Laboratories Incorporated: *See—*
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Guffroy, Rene , to Laboratories Polypharma. Reagent comprising treated red blood cells and methods for detecting rheumatoid factor. 4,587,222, Cl. 436-509.000.
Guha, Probir K.; Iseler, Kenneth A.; and Yen, Robert C., to Budd Company. Tank tread pad and composition for making. 4,587,280, Cl. 523-222.000.
Gunther, John E.; and Smith, Ronald T., to Hughes Aircraft Company. Diffraction optics diffusing screen. 4,586,781, Cl. 350-3.700.
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Hachisuga, Takaaki; Takahashi, Tomohiko; Kagaya, Koji; and Nagashima, Masayoshi, to Kabushiki Kaisha Toshiba. Transfer apparatus for monochromatic or multi-color printing. 4,586,834, Cl. 400-120.000.
Hagan, James A.; Maloy, James E.; and Wilke, Myron A. W., to International Business Machines Corporation. Magnetic disk coating method and apparatus. 4,587,139, Cl. 427-130.000.
Hagemeister, Klaus, to Motoren-und Turbinen-Union Munchen GmbH. Guide wall of a heat exchanger for covering the U-shaped portions of a tube assembly. 4,586,564, Cl. 165-159.000.
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Halczenko, Wasyl; and Hartman, George D., to Merck & Co., Inc. Bridged pyridine compounds useful as calcium channel blockers and analgesics. 4,587,253, Cl. 514-289.000.
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Halliburton Company: *See*—
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Hallstrom, Bengt; Olsson, Olle; Bolmstedt, Ulf; and Johansson, Bjorn-Olow, to Alfa-Laval AB. Plate evaporator. 4,586,565, Cl. 165-167.000.
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Hamaguri, Kenji, to Minolta Camera Kabushiki Kaisha. Noninvasive device for photoelectrically measuring the property of arterial blood. 4,586,513, Cl. 128-633.000.
Hamanaka, Kunio, to Tokyo Shibaura Denki Kabushiki Kaisha. Disk positioning mechanism for flexible magnetic disk drive apparatus. 4,587,586, Cl. 360-99.000.
Hamano, Toshihisa; Nakamura, Takeshi; and Fuse, Mario, to Fuji Xerox Co., Ltd. Process for forming passivation film on photoelectric conversion device and the device produced thereby. 4,587,171, Cl. 428-448.000.
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Hansen, John C. Rotatable discharge conveyor for a belly-dump trailer. 4,586,865, Cl. 414-519.000.
Hansen, Scott A., to Prince Corporation. Automatic dimming switch for a vehicle illuminated visor. 4,586,788, Cl. 350-283.000.
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Harada, Steve N.; and Harada, Kathleen L. Convertible stroller. 4,586,721, Cl. 280-30.000.
Harada, Tuneo; Takemoto, Hisao; and Igarashi, Tatsuo, to Toyo Soda Manufacturing Co., Ltd. Process for preparation of aspartylphenylalanine alkyl esters. 4,587,214, Cl. 435-70.000.
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Yagi, Hiroshi; Harada, Yoshio; and Ito, Tetsuro, 4,586,544, Cl. 140-105.000.
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Hardy, Frederick E.; and Thompson, James E., to Procter & Gambel Company, The. Synthesis of hydrophilic phenol ester derivatives. 4,587,054, Cl. 260-410.500.
Hargreaves, Rodney B.: *See*—
Brown, David; Dowell, Robert I.; Hargreaves, Rodney B.; and Main, Brian G., 4,587,246, Cl. 514-222.000.
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Blom, Eric D.; Singer, Mark I.; and Harkleroad, Barry A., 4,586,931, Cl. 623-9.000.
Harmon, Barry J.: *See*—
Danelson, Terry L.; and Harmon, Barry J., 4,586,593, Cl. 192-67.00R.
Harper, George S., to Airpax Corporation. Snap in panel mounted circuit breaker. 4,587,391, Cl. 200-296.000.
Harper, William H.: *See*—
Frederickson, James R.; Harper, William H.; and Perez, Raymond, 4,586,740, Cl. 294-1.100.
Harrah, Larry A.; and Zeigler, John M., to United States of America, Energy. Method of using polysilane positive photoresist materials. 4,587,205, Cl. 430-326.000.
Harris Corporation: *See*—
Curtin, Leonard E., 4,587,380, Cl. 179-17.00A.
Harris, Elbert E.; Thorsett, Eugene D.; and Patchett, Arthur A., to Merck & Co., Inc. Substituted enantholactam derivatives as antihypertensives. 4,587,050, Cl. 260-239.30R.
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Harrison, Marc L., to AT&T Bell Laboratories. Operations on a semiconductor integrated circuit having two kinds of buffers. 4,586,242, Cl. 29-574.000.
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Swinehart, Carl F., 4,586,785, Cl. 350-96.280.
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Hartemann, Pierre: *See*—
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Satzinger, Gerhard; Hartenstein, Johannes; Fritschi, Edgar; and Vigelius, Wolf-Dieter, 4,587,263, Cl. 514-553.000.
Harth, Hubert; Wuest, Willi; Bruhn, Hans-Athanas; Danielisz, Miklos; and Heinrich, Erbo, to Henkel Kommanditgesellschaft auf Aktien. Process for production of 2-cyanoacrylates from 2,4-dicyanoglutarates. 4,587,059, Cl. 558-464.000.
Hartig, Franz; and Tomm, Dagwin, to Fichtel & Sachs AG. Clutch disc under-toad and idling damping means. 4,586,595, Cl. 192-106.200.
Hartig, Jurgen; Schuch, Gunter; Stoessel, Armin; Herrmann, Guenter; Brunner, Arthur; Zehner, Peter; and Grosskinsky, Otto-Alfred, to BASF Aktiengesellschaft. Continuous preparation of oxygen-containing compounds. 4,587,363, Cl. 568-357.000.
Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., to AT&T Bell Laboratories. High voltage solid-state switch. 4,587,656, Cl. 357-38.000.
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Halczenko, Wasyl; and Hartman, George D., 4,587,253, Cl. 514-289.000.
Hartman, John E.; Petrovich, Roger; and Bortnick, Frank, to F.J.R. Industries, Inc. Fishing rod holder. 4,586,688, Cl. 248-538.000.
Harydzak, Richard; and Kraykovic, J. Alan. Portable pulling apparatus. 4,586,230, Cl. 29-254.000.
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Hasegawa, Shumpei: *See*—
Kishida, Eiji; and Hasegawa, Shumpei, 4,586,481, Cl. 123-587.000.
Hasegawa, Toshifumi: *See*—
Ohkoshi, Fumihiko; Hasegawa, Toshifumi; and Kanii, Norikazu, 4,586,860, Cl. 409-233.000.
Hashikawa, Tadashi: *See*—
Tanaka, Takeshi; Jotatsu, Masao; Higaki, Masaaki; Hamada, Toshimasa; Hashikawa, Tadashi; Ohashi, Toneri; and Togawa, Seigo, 4,586,664, Cl. 241-213.000.
Hashimoto, Shintaro; and Saiji, Mitsuhiro, to Sharp Kabushiki Kaisha. Information retrieval system equipped with video disk. 4,587,635, Cl. 364-900.000.
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Hastings, Richard P., to Nuclear Protection Systems, Inc. Nuclear disposal method and system. 4,586,849, Cl. 405-128.000.
Hatakeyama, Yoshiharu; and Kikuma, Yosiro, to Yoshida Industry Co., Ltd. Container cap. 4,586,623, Cl. 215-301.000.
Hatamura, Yotaro. Load converter. 4,586,577, Cl. 177-211.000.

Hattori, Yoshiyuki: *See—*
Watanabe, Kiyohiko; Hattori, Yoshiyuki; Matsui, Kazuma; Takei, Toshihiro; Nakamura, Toshiaki; and Ohnishi, Syunsaku, 4,586,877, Cl. 417-365.000.

Hauni-Werke Korber & Co. KG: *See—*
Wochnowski, Waldemar, 4,586,517, Cl. 131-84.100.

Hawke, Basil C., to United States of America, Energy. Control rod drive. 4,587,084, Cl. 376-336.000.

Hawkins, John, to Cubi Cubes Pty. Limited. Food dispenser. 4,586,429, Cl. 99-407.000.

Haws, Paul M. Mobile concrete mixing apparatus. 4,586,824, Cl. 366-14.000.

Hayakawa, Koshiro: *See—*
Nakayama, Kiyoshi; Kato, Takashi; Sekiguchi, Tatsuo; Satoh, Mamoru; and Hayakawa, Koshiro, 4,586,348, Cl. 62-277.000.

Hayashi, Nobuyasu; and Fujimura, Takashi, to Hitachi, Ltd. Exposure apparatus. 4,586,799, Cl. 354-1.000.

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Ozawa, Toshiyuki; Uotani, Osamu; and Hayashi, Rieko. 4,587,120, Cl. 424-57.000.

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Koba, Yositaka; Hayashi, Yoshiki; and Torikoshi, Kunikazu, 4,586,485, Cl. 126-248.000.

Hayatdavoudi, Asadollah, to Hayatdavoudi, Asadollah. Fluid agitation system. 4,586,825, Cl. 366-137.000.

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Hayman, Nigel W.: *See—*
Smith, Francis S.; McIntosh, Bruce M.; Hayman, Nigel W.; and Davidson, Scott, 4,586,708, Cl. 273-73.00D.

Hazelett Strip-Casting Corporation: *See—*
Govaerts, Marcel K.; Gielen, Hendrik A. L.; and Dompas, John M. A., 4,586,559, Cl. 164-455.000.

Hedquist, Ace H.; and Spector, George. Distance stick. 4,586,454, Cl. 116-28.00R.

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Johnson, Shepard D.; French, Andrew; Ellis, Allan E.; Hedrick, Dennis R.; and Helfenberger, Charles D., 4,586,837, Cl. 400-216.200.

Hedrick, Ross M.: *See—*
Garner, Albert Y.; Gabbert, James D.; and Hedrick, Ross M., 4,587,305, Cl. 525-331.900.

Heffner, James D.: *See—*
Coursen, David L.; and Heffner, James D., 4,586,438, Cl. 102-313.000.

Hefner, Robert E., Jr., to Dow Chemical Company, The. Reactive flexibilizing monomer and thermosettable compositions containing same. 4,587,293, Cl. 525-49.000.

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Robertson, David K., 4,587,421, Cl. 250-239.000.

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Heintzmann, Peter; Koppers, Manfred; Bohnes, Karlheinz; and Smektala, Rolf-Peter, to Bochumer Eisenhutte Heintzmann GmbH & Co. KG. Arrangement for supplying of consumers with pressure fluids. 4,586,530, Cl. 137-322.000.

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Parsons, Kenneth M.; and Helms, Darrell L., 4,587,525, Cl. 343-821.000.

Hemmila , Ilkka: *See—*
Soini, Erkki; Hemmila , Ilkka; and Lovgren, Timo, 4,587,223, Cl. 436-536.000.

Heng, Jean-Paul; Marmonier, Andre ; and Briguet, Etienne, to Cgee Alsthom. Device for attaching an object to a wall. 4,586,843, Cl. 403-252.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Harth, Hubert; Wuest, Willi; Bruhn, Hans-Athanas; Danielisz, Miklos; and Heinrich, Erbo, 4,587,059, Cl. 558-464.000.
Kruse, Hans; Witthaus, Martin; Altenschopfer, Theodor; and Schumann, Klaus, 4,587,031, Cl. 252-135.000.

Henkelmann, Wigand, to Emuco Aktiengesellschaft fur Maschinenbau. Apparatus for automatically transporting work-pieces in a drop forging press. 4,586,365, Cl. 72-405.000.

Henneberger, Gerd: *See—*
Reiss, Gerald; and Henneberger, Gerd, 4,586,277, Cl. 38-77.810.

Henrekson, Ulf A.: *See—*
Backman, Erik E.; Henrekson, Ulf A.; and Nertman, Inge L., 4,586,316, Cl. 53-449.000.

Henry, Emile J.; and Belanger, Donald J. Ice surfacing apparatus. 4,586,275, Cl. 37-227.000.

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Raush, Russell G.; Alleman, Raymond A.; and Hensel, Victor B., 4,586,644, Cl. 228-5.100.

Herberg, Helmut, to Siemens Aktiengesellschaft. Light-triggerable thyristor having a low light power requirement. 4,587,546, Cl. 357-38.000.

Herbst, Desra N., Jr.: *See—*
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.

Hercules Incorporated: *See—*
Berta, Dominic A., 4,587,302, Cl. 525-237.000.
Valentine, Robert H., 4,587,300, Cl. 525-95.000.

Hergenrother, Paul M.; and Jensen, Brian J., to United States of America, National Aeronautics and Space Administration. Sulfone-ester polymers containing pendent ethynyl groups. 4,587,312, Cl. 525-535.000.

Hermann, Bernhard: *See—*
Muerdter, Herbert; Hermann, Bernhard; and Pfister, Johann, 4,586,575, Cl. 177-124.000.

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Muller-Erwig, Horst; and Brand, Wilhelm, 4,586,410, Cl. 83-175.000.

Herriau, Jean-Pierre: *See—*
Huignard, Jean-Pierre; Rak, Daniel; Ledoux, Isabelle; and Herriau, Jean-Pierre, 4,586,779, Cl. 350-364.000.

Herrig, Robert A.: *See—*
Hollstein, Thomas E.; Herrig, Robert A.; Fulkerson, Terrence M.; and Sharpless, John, 4,586,386, Cl. 73-861.040.

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Hartig, Jurgen; Schuch, Gunter; Stoessel, Armin; Herrmann, Guenter; Brunner, Arthur; Zehner, Peter; and Grosskinsky, Otto-Alfred, 4,587,363, Cl. 568-357.000.

Herscovici, Harry, to Cordis Corporation. Dual channel cardiac pacer isolation circuit. 4,586,507, Cl. 128-419.0PG.

Hershberger, Charles L., to Eli Lilly and Company. Novel bioconverting microorganisms. 4,587,218, Cl. 435-253.000.

Herzik, Aubrey M.: *See—*
Nielsen, Robert C.; Aiken, John A., Jr.; and Herzik, Aubrey M., 4,587,631, Cl. 364-900.000.

Herzog, Klaus, to Carl-Zeiss-Stiftung, Heidenheim/Brenz. Method and apparatus for determining and correcting guidance errors. 4,587,622, Cl. 364-561.000.

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Hornak, Thomas; Baldwin, Gary L.; and Potter, Ronald W., 4,587,477, Cl. 323-312.000.
Straton, Peter R.; and McClelland, Scott R., 4,587,630, Cl. 364-900.000.

Hickey, Christopher D. D.; and Parker, Bernhard D., to Underwater Storage Limited. Underwater weapon systems. 4,586,421, Cl. 89-1.810.

Hickman, John B., to W. P. Hickman Company. Retainer clamp membrane fastening system. 4,586,301, Cl. 52-96.000.

Hider, Robert C.; Kontoghiorghes, George; Silver, Jack; and Stockham, Michael A., to National Research Development Corp. Pharmaceutical compositions. 4,587,240, Cl. 514-188.000.

Higaki, Masaaki: *See—*
Tanaka, Takeshi; Jotatsu, Masao; Higaki, Masaaki; Hamada, Toshimasa; Hashikawa, Tadashi; Ohashi, Toneri; and Togawa, Seigo, 4,586,664, Cl. 241-213.000.

Higeta, Kazuya; Fujioka, Kazumasa; Nemoto, Takeo; Daikoku, Takahiro; and Nakajima, Isao, to Hitachi, Ltd. Thermal head. 4,587,399, Cl. 219-216.000.

Higuchi, Akira; and Shimizu, Hisao, to Toray Industries, Inc. Artificial grain leather. 4,587,142, Cl. 428-15.000.

Higuchi, Masahiro: *See—*
Miyauchi, Masahiro; and Higuchi, Masahiro, 4,587,537, Cl. 346-208.000.

Hille, Martin; Friede, Wolfgang; Wittkus, Heinz; Engelhardt, Friedrich; and Riegel, Ulrich, to Hoechst Aktiengesellschaft. Cement slurries for deep holes, with a copolymer content for reducing the water loss. 4,587,283, Cl. 524-3.000.

Hinn, Werner, to RCA Corporation. Automatic kinescope bias control system with modified initial operation. 4,587,566, Cl. 358-242.000.

Hintner, Joseph, to Knorr-Bremse GmbH. Brake control valve system for rail vehicle air brake. 4,586,756, Cl. 303-37.000.

Hinxlage, Aloys, to Holstein und Kappert GmbH. Arrangement for filling of liquids. 4,586,548, Cl. 141-57.000.

Hiraga, Masaharu; and Daikohara, Tamotsu, to Sanden Corporation. Refrigerant compressor with a capacity adjusting mechanism. 4,586,874, Cl. 417-222.000.

Hirai, Hidefumi; Komiyama, Makoto; and Wada, Keiichiro, to Hirai, Hidefumi. Method for separating carbon dioxide from mixed gas. 4,587,114, Cl. 423-247.000.

Hirai, Hiromu: *See—*
Ikebe, Yo; and Hirai, Hiromu, 4,587,469, Cl. 318-432.000.

Hirai, Yutaka; Tomida, Yoshinori; Matsuda, Hiroshi; and Nishimura, Yukuo, to Canon Kabushiki Kaisha. Pattern forming method. 4,586,980, Cl. 156-655.000.

Hiraki, Toshiro K. Personal security alarm. 4,587,516, Cl. 340-539.000.

Hiramoto, Kazuo: *See—*
Takeda, Renzo; Miki, Kazuyoshi; Ohga, Yukiharu; Fuse, Motomasa; Hiramoto, Kazuo; and Aoyama, Motoo, 4,587,089, Cl. 376-428.000.

Hiramoto, Shigeru: *See—*
Otake, Noboru; Seto, Haruo; Sasaki, Tetsuo; Sugita, Masanori; and Hiramoto, Shigeru, 4,587,237, Cl. 514-183.000.

Hirao, Yoshikazu; and Umesaki, Shigeo, to Honda Giken Kogyo Kabushiki Kaisha; and Oki Electric Industry, Co., Ltd. Fail-safe system for vehicular computer. 4,587,655, Cl. 371-12.000.

Hiratsuka, Yutaka: *See*—
Tochigi, Kenji; Hanyu, Yoshiaki; and Hiratsuka, Yutaka, 4,586,819, Cl. 356-301.000.

Hironaka, Katsumi: *See*—
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Hirose, Iwao: *See*—
Kondo, Shuzi; Hirose, Iwao; and Wakabayashi, Masayoshi, 4,586,978, Cl. 156-540.000.

Hirota, Akira; and Ichinoi, Yutaka, to Victor Company of Japan, Ltd. Video signal processing apparatus with pre emphasis and de-emphasis for use in a recording and reproducing system. 4,587,576, Cl. 360-33.100.

Hirsch, Hermann; and Pichler, Heinrich. Information system. 4,586,827, Cl. 368-282.000.

Hirsh, Jody K., to UOP Inc. Highly thermostable amyloglucosidase. 4,587,215, Cl. 435-96.000.

Hirt, Robert P., Jr.: *See*—
Giles, Harold F., Jr.; and Hirt, Robert P., Jr., 4,587,295, Cl. 525-57.000.

Hiruta, Shiro: *See*—
Miki, Kosuke; and Hiruta, Shiro, 4,586,437, Cl. 102-220.000.

Hitachi Chemical Co., Ltd.: *See*—
Kojima, Mithumasa; Kataoka, Fumio; Shoji, Fusaji; and Yokono, Hitoshi, 4,587,197, Cl. 430-196.000.
Ohta, Tomohisa; Dobashi, Akihiko; and Seki, Yasuyuki, 4,587,313, Cl. 526-75.000.

Hitachi Construction Machinery Co., Ltd.: *See*—
Watanabe, Hiroshi; Izumi, Eiki; Aoyagi, Yukio; Honma, Kazuo; and Nakajima, Kichio, 4,586,330, Cl. 60-421.000.

Hitachi Keiyo Engineering Co., Ltd.: *See*—
Sarugaku, Shinichi; and Tsuji, Masao, 4,587,398, Cl. 219-124.220.

Hitachi, Ltd.: *See*—
Azekura, Kazuo; Kawashima, Katsuyuki; Inoue, Kotaro; and Uchikawa, Sadao, 4,587,078, Cl. 376-267.000.
Hayashi, Nobuyasu; and Fujimura, Takashi, 4,586,799, Cl. 354-1.000.
Higeta, Kazuya; Fujioka, Kazumasa; Nemoto, Takeo; Daikoku, Takahiro; and Nakajima, Isao, 4,587,399, Cl. 219-216.000.
Hosoda, Yuji; Kojima, Yoshio; Fujie, Masakatsu; Honma, Kazuo; Iwamoto, Taro; Nakano, Yoshiyuki; and Kamejima, Kohji, 4,586,335, Cl. 60-528.000.
Ikebe, Yo; and Hirai, Hiromu, 4,587,469, Cl. 318-432.000.
Inoue, Eisuke; Nonaka, Yasuhiko; and Yamamoto, Masanao, 4,587,456, Cl. 313-366.000.
Isogai, Masato; Iwasaki, Kishiro; and Nakano, Fumio, 4,586,791, Cl. 350-341.000.
Izumi, Shigeru; Michiguchi, Yoshihiro; and Senoh, Makoto, 4,586,378, Cl. 73-572.000.
Kawamura, Fumio; Kikuchi, Makoto; and Funabashi, Kiyomi, 4,587,232, Cl. 502-400.000.
Kishimoto, Munehisa; Sakata, Noboru; Kimura, Miyoshi; Fujiwara, Kouichi; and Komura, Hidekazu, 4,586,789, Cl. 350-336.000.
Kojima, Mithumasa; Kataoka, Fumio; Shoji, Fusaji; and Yokono, Hitoshi, 4,587,197, Cl. 430-196.000.
Kudo, Hiroshi, 4,587,561, Cl. 358-167.000.
Mochida, Takaaki; and Yamashita, Junichi, 4,587,090, Cl. 376-428.000.
Murai, Toshiaki; Kawana, Takeshi; and Asano, Toshio, 4,586,247, Cl. 29-705.000.
Murayama, Seiichi; Yasuda, Makoto; Miyashita, Tsune; Arai, Yoji; Kawasumi, Kenichi; and Kinoshita, Kazunori, 4,587,460, Cl. 315-174.000.
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, 4,587,162, Cl. 428-290.000.
Nakano, Kouichi; Maruyama, Seiichi; Nakano, Seizo; and Sato, Masatomo, 4,587,592, Cl. 361-127.000.
Ohta, Masutomi; and Kawana, Fumihiro, 4,587,521, Cl. 340-825.300.
Ono, Tetsuo; Watanabe, Yoshio; Matsuno, Hiromitsu; Kaio, Yasuo; Murayama, Seiichi; and Mikoshiba, Shigeo, 4,587,453, Cl. 313-25.000.
Osawa, Michitaka; Ando, Kunio; and Maekawa, Hitoshi, 4,587,495, Cl. 330-311.000.
Sarugaku, Shinichi; and Tsuji, Masao, 4,587,398, Cl. 219-124.220.
Takeda, Renzo; Miki, Kazuyoshi; Ohga, Yukiharu; Fuse, Motomasa; Hiramoto, Kazuo; and Aoyama, Motoo, 4,587,089, Cl. 376-428.000.
Tochigi, Kenji; Hanyu, Yoshiaki; and Hiratsuka, Yutaka, 4,586,819, Cl. 356-301.000.
Tosaki, Hiromi; Mozume, Teruo; Arima, Hideo; and Ikegami, Akira, 4,587,040, Cl. 252-519.000.
Umeda, Takao; Miyashita, Takao; Shimazaki, Yuzuru; Igawa, Tatsuo; Sasaki, Ken; and Matsuyama, Shigeru, 4,586,790, Cl. 350-337.000.
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Yatsuda, Yuji; Hagiwara, Takaaki; Kondo, Ryuji; Minami, Shinichi; and Itoh, Yokichi, 4,586,238, Cl. 29-571.000.

Hitachi Metals, Ltd.: *See*—
Shimizu, Hideaki; Kofune, Eiichi; Saitoh, Haruhisa; and Kobayashi, Katsuya, 4,587,022, Cl. 210-710.000.

Hlavka, Joseph J.; Child, Ralph G.; Bitha, Panayota; and Lin, Yang I., to American Cyanamid Company. Platinum complexes of polyhydroxylated alkylamines and 2-polyhydroxylated alkyl-1,2-diaminoethanes. 4,587,331, Cl. 536-55.000.

Ho, Cecil T.; and Wilman, John G., to International Business Machines Corporation. Electron beam control system. 4,587,464, Cl. 315-382.000.

Ho, Chih Y., to McNeilab, Inc. Amidine benzodiazepines, methods for their use and intermediates. 4,587,244, Cl. 514-219.000.

Ho, Chih Y., to McNeilab, Inc. 1-amino-or nitro-benzyl)indoles useful as intermediates. 4,587,349, Cl. 548-491.000.

Ho, Kwang-Liang. Safety device for arbor of fastening machine. 4,586,248, Cl. 29-708.000.

Ho, Shu K.: *See*—
Wang, An; Fry, Stanley B.; Ho, Shu K.; and Smutek, John M., 4,587,633, Cl. 364-900.000.

Hochstein, Waldhelm: *See*—
Bronstert, Klaus; Hochstein, Waldhelm; Vogel, Hans-Henning; and Rath, Hans P., 4,587,307, Cl. 525-362.000.

Hochtemperatur-Reaktorbau GmbH: *See*—
Schoening, Josef; and Schwiers, Hans-Georg, 4,587,082, Cl. 376-291.000.

Hodlewsky, Wasyly G., to Rexnord Inc. Magnetized conveyor and chain links. 4,586,601, Cl. 198-690.100.

Hoechst Aktiengesellschaft: *See*—
Diener, Arnulf; Kettler, Hans; and Tenhaven, Ulrich, 4,587,135, Cl. 427-13.000.
Hille, Martin; Friede, Wolfgang; Wittkus, Heinz; Engelhardt, Friedrich; and Riegel, Ulrich, 4,587,283, Cl. 524-3.000.
Lind, Erwin; and Haberhauer, Helmuth, 4,587,192, Cl. 430-117.000.
Pieper, Werner, 4,587,334, Cl. 544-192.000.
Schinzel, Erich; and Pelster, Manfred, 4,587,338, Cl. 544-197.000.
von Werner, Konrad, 4,587,366, Cl. 570-172.000.

Hoeksma, Gerben S., to N.V. Nederlandsche Apparatenfabriek NEDAP. Safety transformer. 4,587,506, Cl. 336-178.000.

Hoffmann-La Roche Inc.: *See*—
Hasler, Heinz; and Schneider, Fernand, 4,587,256, Cl. 514-369.000.

Hofmeister, Helmut: *See*—
Annen, Klaus; Petzoldt, Karl; Laurent, Henry; Wiechert, Rudolf; and Hofmeister, Helmut, 4,587,236, Cl. 514-179.000.

Hofmeister, Werner, to Robert Bosch GmbH. Multi-terminal plug-socket connection arrangement. 4,586,766, Cl. 339-45.00M.

Hogge, Charles R., Jr., to Rockwell International Corporation. Circuit for controllable generation of pseudoerrors in bit processing. 4,587,653, Cl. 371-6.000.

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Muraguchi, Yutaka; Yoshida, Katsusuke; and Shiraishi, Shoichi, 4,586,864, Cl. 414-433.000.

Holland, A. Ronald: *See*—
Kennedy, Joe H.; Holland, A. Ronald; Richey, Thomas; and Alsup, James D., Jr., 4,586,762, Cl. 312-330.00R.

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Holley, Kenneth: *See*—
Newman, Allen R.; and Holley, Kenneth, 4,586,854, Cl. 406-153.000.

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Nystrom, Wilford O.; Riedel, Kenneth E.; and Doerschner, David L., 4,586,974, Cl. 156-165.000.

Hollstein, Thomas E.; Herrig, Robert A.; Fulkerson, Terrence M.; and Sharpless, John, to Nordson Corporation. Method and apparatus for determining powder flow rate and transfer efficiency of powder spray system. 4,586,386, Cl. 73-861.040.

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Holstein und Kappert GmbH: *See*—
Hinxlage, Aloys, 4,586,548, Cl. 141-57.000.

Homan, Gary R.: *See*—
Cornwall, Susan M.; and Homan, Gary R., 4,586,518, Cl. 132-7.000.

Homan, Merle E.: *See*—
Fisk, Dale E.; Griffith, Robert L.; Homan, Merle E.; Radin, George; and Richards, Waldo J., 4,587,612, Cl. 364-200.000.

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Hirao, Yoshikazu; and Umesaki, Shigeo, 4,587,655, Cl. 371-12.000.
Kishida, Eiji; and Hasegawa, Shumpei, 4,586,481, Cl. 123-587.000.
Watanabe, Masaki; Yagasaki, Akio; and Matsuoka, Yoshinori, 4,586,722, Cl. 280-103.000.

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Bonne, Ulrich; and Johnson, Robert G., 4,587,105, Cl. 422-98.000.
Eck, Bertil, 4,586,768, Cl. 339-45.00M.

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Boudreau, Daniel A.; Sandini, James M.; and Salas, Edward R., 4,587,609, Cl. 364-200.000.

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Hosoda, Yuji; Kojima, Yoshio; Fujie, Masakatsu; Honma, Kazuo; Iwamoto, Taro; Nakano, Yoshiyuki; and Kamejima, Kohji, 4,586,335, Cl. 60-528.000.
Watanabe, Hiroshi; Izumi, Eiki; Aoyagi, Yukio; Honma, Kazuo; and Nakajima, Kichio, 4,586,330, Cl. 60-421.000.

Honsberg, Friedrich-Wilhelm: *See*—
Jurgensmeyer, Willi; Honsberg, Friedrich-Wilhelm; and Halbach, Kurt. 4,586,360, Cl. 72-328.000.
Hopkins, William G.; and Reid, Philip L. Perspective drawing apparatus. 4,586,265, Cl. 33-432.000.
Hopkins, William G. Folding display assembly. 4,586,279, Cl. 40-124.100.
Hoppe, Joachim; and Haghiri-Tehrani, Yahya, to GAO Gesellschaft fur Automation und Organisation mbH. IC-module identification card. 4,587,413, Cl. 235-492.000.
Hor, Ah-Mee; and Loutfy, Rafik O., to Xerox Corporation. Photoconductive imaging members with perylene pigment compositions. 4,587,189, Cl. 430-59.000.
Horada, Osamu; and Anda, Yasusuke, to Isuzu Motors, Ltd. Fuel control mechanism for internal combustion engine. 4,586,471, Cl. 123-399.000.
Horiba Instruments Incorporated: *See*—
Lewis, Gary W., 4,586,367, Cl. 73-23.000.
Horiba, Ltd.: *See*—
Yokoyama, Issei; and Hara, Kiyoaki, 4,586,820, Cl. 356-317.000.
Horii, Taichi, to Kabushiki Kaisha Maki Seisakusho. Method and apparatus for sorting fruits and vegetables. 4,586,613, Cl. 209-556.000.
Horler, Hansulrich, to BBC Brown, Boveri & Co., Ltd. Exhaust gas turbocharger with adjustable slide ring. 4,586,336, Cl. 60-602.000.
Hornak, Thomas; Baldwin, Gary L.; and Potter, Ronald W., to Hewlett-Packard Company. Binary scaled current array source for digital to analog converters. 4,587,477, Cl. 323-312.000.
Hornyak, Gyula: *See*—
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.
Horodysky, Andrew G.; and Kaminski, Joan M., to Mobil Oil Corporation. Zwitterionic quaternary ammonium carboxylates, their metal salts and lubricants containing same. 4,587,025, Cl. 252-34.000.
Horodysky, Andrew G., to Mobil Oil Corporation. Multifunctional lubricant additives. 4,587,026, Cl. 252-47.500.
Horyu, Sakae: *See*—
Matsuoka, Mikiharu; Katayama, Hirohiko; and Horyu, Sakae, 4,587,663, Cl. 377-2.000.
Hoshino, Fumio; and Mochizuki, Yasuyoshi, to Fuji Photo Film Co., Ltd. Original table for use in an imaging apparatus or the like. 4,586,815, Cl. 355-76.000.
Hoshiyama, Hidetoshi: *See*—
Tokuno, Masateru; Sawada, Tetsuya; Hoshiyama, Hidetoshi; and Yoneda, Toshihiro, 4,586,434, Cl. 101-178.000.
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Hotchkiss, Harry W.; Fields, Robert D.; and Rolsten, Gina K., to Kimberly-Clark Corporation. Oil and grease absorbent rinsable nonwoven fabric. 4,587,154, Cl. 428-195.000.
Hotta, Toshihiro, to Kabushiki Kaisha Morita Seisakusho. Sudden stop circuit for a brushless micromotor. 4,587,468, Cl. 318-362.000.
Houck, Richard C.: *See*—
Choate, Bruce T.; and Houck, Richard C., 4,586,234, Cl. 29-430.000.
Howald, Werner E. Combustion apparatus including an air-fuel premixing chamber. 4,586,328, Cl. 60-39.290.
Howard, Willis H. Extensible wrench construction. 4,586,406, Cl. 81-177.200.
Howe, Robert K.; and Lee, Len F., to Monsanto Company. 2,4-disubstituted-5-thiazole-carboxylic acids and derivatives. 4,586,948, Cl. 71-90.000.
Howey, Jon A., to Kendall Company, The. Nonwoven fabric. 4,586,606, Cl. 206-313.000.
Hriscisce, Frank T.: *See*—
Cherukuri, Subraman R.; Hriscisce, Frank T.; Siecke, Albert E.; and Wei, You C., 4,587,125, Cl. 426-3.000.
Hsia, Chung H., to Mobil Oil Corporation. Dimethylether recovery and/or recycle in an MTC conversion plant. 4,587,373, Cl. 585-639.000.
Hsiao, Chiin H., to Key Pharmaceuticals, Inc. Dry sustained release theophylline oral formulation. 4,587,118, Cl. 424-19.000.
Hsieh, Eric T.: *See*—
Smith, Paul D.; and Hsieh, Eric T., 4,587,227, Cl. 502-153.000.
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Hua, Zhu Y.: *See*—
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Hubbard, Stirling J. Aerodynamically stabilized motorcyclist helmet. 4,586,197, Cl. 2-410.000.
Hubner, Erwin; and Meier, Hans, to Siemens Aktiengesellschaft. Temperature measuring resistor probe. 4,586,829, Cl. 374-144.000.
Huels Aktiengesellschaft: *See*—
Mueller, Dieter J., 4,587,367, Cl. 570-216.000.
Huffman, William F.; and Moore, Michael L., to SmithKline Beckman Corporation. Intermediates for preparing octapeptide vasopressin antagonists. 4,587,045, Cl. 530-328.000.
Huftle, Jurgen: *See*—
Sartor, Bruno; Huftle, Jurgen; Strasmann, Burkhart; and Fischer, Franz-Josef, 4,586,224, Cl. 29-121.200.
Hughes Aircraft Company: *See*—
Brault, Robert G.; and Miller, Leroy J., 4,587,203, Cl. 430-325.000.
Chern, Mao-Jin; Gunther, John E.; and Smith, Ronald T., 4,586,780, Cl. 350-3.700.
Falce, Louis R.; and Breeze, Glenn S., 4,587,455, Cl. 313-346.0DC.
Gunther, John E.; and Smith, Ronald T., 4,586,781, Cl. 350-3.700.
Lau, Kreisler S. Y., 4,587,315, Cl. 526-247.000.
Hughes, Thomas M. Lantern holder. 4,587,603, Cl. 362-427.000.
Huignard, Jean-Pierre; Rak, Daniel; Ledoux, Isabelle; and Herriau, Jean-Pierre, to Thomson-CSF. Device for memory-storage of a coherent image in a multitude optical cavity. 4,586,779, Cl. 350-364.000.
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Watson, Stuart L., Jr.; and Humphreys, Gordon R., 4,587,301, Cl. 525-123.000.
Humphreys, Robert W. R.: *See*—
Lien, Qcheng S.; and Humphreys, Robert W. R., 4,587,276, Cl. 522-34.000.
Humpolik, Bohumil: *See*—
Kern, Josef; Bardong, Helmut; Humpolik, Bohumil; and Staffa, Karl-Heinz, 4,586,566, Cl. 165-173.000.
Hundley, John G.: *See*—
Brown, Albert P.; and Hundley, John G., 4,587,355, Cl. 562-414.000.
Hunter, Richard P. Suspended ceiling. 4,586,841, Cl. 403-230.000.
Husson, Alan L.: *See*—
Dirnberger, Linus R.; Husson, Alan L.; and Brick, Michael J., 4,587,511, Cl. 340-19.00R.
Hutter, Ernest, to United States of America, Energy. Nuclear reactor safety device. 4,587,085, Cl. 376-336.000.
Hyde, Walter E., to Halliburton Company. Retrievable fluid control valve. 4,586,569, Cl. 166-317.000.
Hymanson, Victor; and Paul, Julian E. Dental aspirator tube. 4,586,900, Cl. 433-96.000.
Hyvonen, Pentti: *See*—
Rajakallio, Pauli; and Hyvonen, Pentti, 4,586,571, Cl. 173-43.000.
Iannella, Vincenzo. Process for preparing 4-hydroxy-2-methyl-2H-1,2-benzothiazine-3-[(N-(2-pyridinyl)carboxamide)]-1,1-dioxide, phosphoric ester. 4,587,335, Cl. 544-49.000.
Iannetta, Raymond: *See*—
Durand, David, 4,587,155, Cl. 428-195.000.
Ichikawa, Kouzo: *See*—
Matsubara, Tetsuyuki; Ito, Norifumi; Ichikawa, Kouzo; Arahari, Kouichi; and Maeda, Tetsuo, 4,587,294, Cl. 525-53.000.
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Hirota, Akira; and Ichinoi, Yutaka, 4,587,576, Cl. 360-33.100.
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, to Yoshino Kogyosho Co., Ltd. Device for removing and conveying injection-molded piece. 4,586,891, Cl. 425-526.000.
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, to Yoshino Kogyosho Co., Ltd. Device for removing and conveying injection-molded piece. 4,586,892, Cl. 425-531.000.
Icking, Friedrich, to Westfalia Separator AG. Support and withdrawal mechanism for milking clusters. 4,586,462, Cl. 119-14.100.
Ide, Fumito, to Kabushiki Kaisha Toshiba. Image forming apparatus. 4,586,813, Cl. 355-50.000.
Ide, Toshiaki: *See*—
Nishimatsu, Masaharu; Ide, Toshiaki; Arioka, Hiroyuki; and Kubota, Yuichi, 4,587,150, Cl. 428-141.000.
Idesawa, Isao, to Nisshin Kogyo Kabushiki Kaisha. Automatic braking gap adjustor system for mechanical type drum brake. 4,586,589, Cl. 188-79.50K.
Igarashi, Tatsuo: *See*—
Harada, Tuneo; Takemoto, Hisao; and Igarashi, Tatsuo, 4,587,214, Cl. 435-70.000.
Igarashi, Yoshinobu; and Nakamura, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Heat pump with multiple compressors. 4,586,351, Cl. 62-468.000.
Igawa, Tatsuo: *See*—
Umeda, Takao; Miyashita, Takao; Shimazaki, Yuzuru; Igawa, Tatsuo; Sasaki, Ken; and Matsuyama, Shigeru, 4,586,790, Cl. 350-337.000.
Igel, Wolfgang, to Zinser Textilmaschinen GmbH. Spinning machine with roving-bobbin feeder. 4,586,326, Cl. 57-281.000.
Ignaz Vogel GmbH & Co. KG: *See*—
Vogel, Ignaz, 4,586,750, Cl. 297-417.000.
Iguchi, Michihisa: *See*—
Satoh, Jinichi; Ino, Hideya; Ishikawa, Masaaki; and Iguchi, Michihisa, 4,586,705, Cl. 271-122.000.
Iida, Kazumasa: *See*—
Takahashi, Akira; Danno, Yoshiaki; Iida, Kazumasa; and Iwata, Toshio, 4,586,475, Cl. 123-425.000.
Iida, Moriya: *See*—
Yamaoka, Noboru; Kezuka, Seiju; Iida, Moriya; Miyoshi, Mituji; and Matsuura, Kazuo, 4,587,039, Cl. 252-511.000.
Iida, Norihiko, to NEC Corporation. High speed frequency divider dividing pulse by a number obtained by dividing an odd number by two. 4,587,664, Cl. 377-48.000.
Iizuka, Kinji; Kamijo, Tetsuhide; Yamamoto, Ryoji; and Harada, Hiromu, to Kissei Pharmaceutical Co., Ltd. Process for the production of nuclear substituted cinnamoylanthranilic acid derivatives. 4,587,356, Cl. 562-455.000.
Iizuka, Kiyoshi: *See*—
Nagano, Akihiko; and Iizuka, Kiyoshi, 4,586,802, Cl. 354-219.000.
Iizuka, Masanori; and Tanaka, Hideki, to Kao Corporation. Cement admixture. 4,586,960, Cl. 106-90.000.

Iizuka, Tetsuya: *See—*
Isobe, Mitsuo; Sakurai, Takayasu; Sawada, Kazuhiro; Iizuka, Tetsuya; Ohtani, Takayuki; and Aono, Akira, 4,587,638, Cl. 365-200.000.

Ikebe, Yo; and Hirai, Hiromu, to Hitachi, Ltd. Electric servo system. 4,587,469, Cl. 318-432.000.

Ikeda, Masaki: *See—*
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Suzuki, Tadashi, 4,587,402, Cl. 219-343.000.

Ikeda, Masami: *See—*
Saito, Akio; Aoki, Seiichi; Inamoto, Tadayoshi; Yokoi, Katsuyuki; and Ikeda, Masami, 4,587,534, Cl. 346-140.00R.

Ikegami, Akira: *See—*
Tosaki, Hiromi; Mozume, Teruo; Arima, Hideo; and Ikegami, Akira, 4,587,040, Cl. 252-519.000.

Ikegami, Tamotsu: *See—*
Morimoto, Kenji; Ikegami, Tamotsu; Naito, Masao; Kubo, Tateo; and Kizawa, Shinichi, 4,586,863, Cl. 413-14.000.

Ikemori, Keiji: *See—*
Tanaka, Tsunefumi; and Ikemori, Keiji, 4,586,793, Cl. 350-426.000.

Ikeya, Seizi; and Tabuchi, Tsuyoshi, to Nippondenso Co., Ltd. Die-casting method and apparatus. 4,586,560, Cl. 164-457.000.

Illinois Tool Works Inc.: *See—*
Rodseth, William G., 4,587,377, Cl. 174-16.0HS.

Imai, Hirosuke: *See—*
Yuasa, Hitoshi; Matsuno, Mitsuo; and Imai, Hirosuke, 4,587,057, Cl. 260-453.000.

Imai, Masaharu; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, to Olympus Optical Co., Ltd.; and Jun-Ichi Nishizawa. Solid state image pick-up device. 4,587,562, Cl. 358-212.000.

Imperial Chemical Industries PLC: *See—*
Arnould, Jean C.; Evans, John R.; Jones, Geraint; and Thomson, David S., 4,587,262, Cl. 514-548.000.
Brown, David; Dowell, Robert I.; Hargreaves, Rodney B.; and Main, Brian G., 4,587,246, Cl. 514-222.000.
Cairns, John F.; Denton, David A.; and Izzard, Patrick A., 4,587,001, Cl. 204-290.00R.
Cartwright, David, 4,586,953, Cl. 71-94.000.
Crowley, Patrick J.; and Williams, John C., 4,586,947, Cl. 71-76.000.
Davies, Stephen P.; and Thompson, Morice W., 4,587,290, Cl. 524-558.000.
Johnson, Graham C.; and Noakes, Timothy J., 4,586,657, Cl. 239-691.000.
Smith, Francis S.; McIntosh, Bruce M.; Hayman, Nigel W.; and Davidson, Scott, 4,586,708, Cl. 273-73.00D.
Wood, Nicholas S., 4,586,998, Cl. 204-252.000.

Imperial Clevite Inc.: *See—*
Adams, Kenneth J.; and Dyke, David E., 4,586,977, Cl. 156-308.600.
Toaz, Milton E.; and Smalc, Martin D., 4,587,177, Cl. 428-614.000.

INA Walzlager Schaeffler KG: *See—*
Oetjen, Jurgen, 4,586,832, Cl. 384-455.000.

Inagaki, Nobuo: *See—*
Kyoto, Michihisa; Yoshioka, Naoki; Tanaka, Gotaro; Watanabe, Minoru; Shimba, Hiroshi; and Inagaki, Nobuo, 4,586,943, Cl. 65-3.120.

Inagaki, Shigemi: *See—*
Nakashima, Seiichiro; Inagaki, Shigemi; and Ito, Susumu, 4,586,868, Cl. 414-735.000.

Inamoto, Tadayoshi: *See—*
Saito, Akio; Aoki, Seiichi; Inamoto, Tadayoshi; Yokoi, Katsuyuki; and Ikeda, Masami, 4,587,534, Cl. 346-140.00R.

Inao, Hiroshi; and Nishida, Mitsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Submersible motor and pump assembly. 4,586,880, Cl. 417-424.000.

Inco Alloys International, Inc.: *See—*
Mankins, William L.; Curtis, Lindy J.; and Stewart, Gene A., 4,587,096, Cl. 419-27.000.

Industrial Design Electronic Associates, Inc.: *See—*
Brejcha, Robert J.; and Kubacki, Leonard J., 4,586,716, Cl. 273-376.000.

Industrial Maintenance Systems, Inc.: *See—*
Zatezalo, John M., 4,586,264, Cl. 33-412.000.

Inglis, Ronald T.: *See—*
DiTommaso, Anthony; Inglis, Ronald T.; Worley, Richard C.; and Renda, Ramon J., 4,586,680, Cl. 244-3.270.

Innes, Donn, to Nicholson Division, Datron Systems, Inc. Gasketed pipe union. 4,586,735, Cl. 285-354.000.

Innis, Charles L., Jr.: *See—*
Simmons, Thomas E.; Divirgilio, Ralph F.; and Innis, Charles L., Jr., 4,586,720, Cl. 277-152.000.

Innovative Concepts, Inc.: *See—*
Long, Jerry M.; and Womack, James A., 4,586,603, Cl. 206-45.180.

Ino, Hideya: *See—*
Satoh, Jinichi; Ino, Hideya; Ishikawa, Masaaki; and Iguchi, Michihisa, 4,586,705, Cl. 271-122.000.

Inoue, Akihisa: *See—*
Masumoto, Tsuyoshi; Inoue, Akihisa; and Tomioka, Hiroyuki, 4,586,957, Cl. 75-124.000.

Inoue, Eisuke; Nonaka, Yasuhiko; and Yamamoto, Masanao, to Hitachi, Ltd. Image pickup tube target. 4,587,456, Cl. 313-366.000.

Inoue-Japax Research Incorporated: *See—*
Inoue, Kiyoshi, 4,586,576, Cl. 177-210.00R.

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Inoue, Kotaro: *See—*
Azekura, Kazuo; Kawashima, Katsuyuki; Inoue, Kotaro; and Uchikawa, Sadao, 4,587,078, Cl. 376-267.000.

Inoue, Manabu: *See—*
Tominaga, Shinji; Nakai, Masaaki; Inoue, Norihiro; Fujino, Akihiko; Inoue, Manabu; and Taniguchi, Nobuyuki, 4,586,800, Cl. 354-21.000.

Inoue, Norihiro: *See—*
Tominaga, Shinji; Nakai, Masaaki; Inoue, Norihiro; Fujino, Akihiko; Inoue, Manabu; and Taniguchi, Nobuyuki, 4,586,800, Cl. 354-21.000.

Inoue, Takashi; Miyoshi, Mituji; Matsuura, Kazuo; and Yamamoto, Kaoru, to Nippon Petrochemicals Company, Limited. Ethylene copolymer compositions for rotational molding. 4,587,318, Cl. 526-282.000.

Inoue, Yoshio: *See—*
Takago, Toshio; Inoue, Yoshio; Terashima, Masami; and Sato, Shiniti, 4,587,354, Cl. 556-417.000.

Institut de Recherches de la Siderurgie Francaise: *See—*
Motte, Jean-Pierre; and Maurer, Ghislain, 4,587,660, Cl. 373-108.000.

Institut de Recherches de la Siderurgie Francaise (IRSID): *See—*
Frou, Pascal; and Krausener, Gilbert, 4,586,356, Cl. 72-8.000.

Institut Francais du Petrole: *See—*
Cosyns, Jean; and Boitiaux, Jean-Paul, 4,587,369, Cl. 585-259.000.

Instituto Lusofarmaco d'Italia S.p.A.: *See—*
Manghisi, Elso; and Cascio, Giuseppe, 4,587,242, Cl. 514-211.000.

Instrumentarium Oy: *See—*
Sepponen, Raimo, 4,587,493, Cl. 324-319.000.

Intel Corporation: *See—*
Yau, Leopoldo D.; Gasser, Robert A., Jr.; Week, Kenneth R., Jr.; Yu, Jick M.; and Chin, David D., 4,587,138, Cl. 427-88.000.

Intelledex Incorporated: *See—*
Edwards, Alan T.; and Smith, Steven A., 4,586,743, Cl. 294-86.400.

Intent Patents A.G.: *See—*
Hanlet, Jacques M., 4,587,461, Cl. 315-224.000.

Inter Control Hermann Kohler Elektrik GmbH & Co. KG: *See—*
Hollweck, Walter, 4,587,508, Cl. 337-343.000.

International Business Machines Corporation: *See—*
Alexander, Randall W.; and Troupes, Demetrios, 4,586,835, Cl. 400-121.000.
Archer, Garv D.; and Greenberg, Herm J., 4,587,628, Cl. 364-900.000.
Carter, Donald L., 4,586,830, Cl. 384-121.000.
Cocke, John; and DiStefano, Thomas H., 4,587,579, Cl. 360-75.000.
Dill, Frederick H.; Gupta, Satish; and Warter, Peter J., 4,587,629, Cl. 364-900.000.
Fisk, Dale E.; Griffith, Robert L.; Homan, Merle E.; Radin, George; and Richards, Waldo J., 4,587,612, Cl. 364-200.000.
Hagan, James A.; Maloy, James E.; and Wilke, Myron A. W., 4,587,139, Cl. 427-130.000.
Ho, Cecil T.; and Wilman, John G., 4,587,464, Cl. 315-382.000.
Jackson, Thomas N., 4,587,540, Cl. 357-22.000.
Johnson, Shepard D.; French, Andrew; Ellis, Allan E.; Hedrick, Dennis R.; and Helfenberger, Charles D., 4,586,837, Cl. 400-216.200.
Nielsen, Robert C.; Aiken, John A., Jr.; and Herzik, Aubrey M., 4,587,631, Cl. 364-900.000.
Satoh, Jinichi; Ino, Hideya; Ishikawa, Masaaki; and Iguchi, Michihisa, 4,586,705, Cl. 271-122.000.

International Harvest Co., Ltd.: *See—*
Mori, Kozo, 4,586,451, Cl. 114-219.000.

International Standard Electric Corporation: *See—*
Langewellpott, Ulrich, 4,587,662, Cl. 375-1.000.

Intraspec, Inc.: *See—*
Sussman, Arthur, 4,586,267, Cl. 34-30.000.

Inui, Masaki: *See—*
Fukuchi, Hisashi; Inui, Masaki; and Iwata, Hideyuki, 4,586,395, Cl. 74-467.000.

Ionics Incorporated: *See—*
Thomas, Martin, Jr., 4,587,269, Cl. 521-38.000.

Isco, Inc.: *See—*
Allington, Robert W., 4,587,463, Cl. 315-307.000.

Iseler, Kenneth A.: *See—*
Guha, Probir K.; Iseler, Kenneth A.; and Yen, Robert C., 4,587,280, Cl. 523-222.000.

Ishida, Takuzo; and Weigel, David C., to Minnesota Mining and Manufacturing Company. Photothermographic stabilizers for syringaldazine leuco dyes. 4,587,211, Cl. 430-619.000.

Ishiguro, Kazuhisa: *See—*
Tanaka, Kanji; and Ishiguro, Kazuhisa, 4,587,500, Cl. 333-213.000.

Ishiguro, Minoru: *See—*
Nishizawa, Tetuo; Asano, Seiji; Ishiguro, Minoru; Komori, Masanoshin; Tobioka, Takashi; Yoshida, Toshio; and Hara, Hiroshi, 4,586,801, Cl. 354-173.100.

Ishii, Katsutoshi, to Seiko Seiki Kabushiki Kaisha. Workpiece centerless support device for use in internal grinding machine. 4,586,295, Cl. 51-236.000.

Ishii, Yoshihiro: *See—*
Tokuno, Masateru; Sawada, Tetsuya; and Ishii, Yoshihiro, 4,586,673, Cl. 242-58.600.

Ishikawa, Masaaki: *See—*
Satoh, Jinichi; Ino, Hideya; Ishikawa, Masaaki; and Iguchi, Michihisa, 4,586,705, Cl. 271-122.000.

Ishikawa, Masao; Koboshi, Shigeharu; and Kurematsu, Masayuki, to Konishiroku Photo Industry Co., Ltd. Method of processing silver

halide photographic light-sensitive material. 4,587,195, Cl. 430-139.000.

Ishise, Kojiro; and Kojima, Keiichi, to Sumitomo Electric Industries, Ltd. Method of forming an insulated conductor splice utilizing heat shrinkable tubes. 4,586,970, Cl. 156-48.000.

Ishizuka, Hisao, to NEC Corporation. Memory system. 4,587,637, Cl. 365-189.000.

Isobe, Mitsuo; Sakurai, Takayasu; Sawada, Kazuhiro; Iizuka, Tetsuya; Ohtani, Takayuki; and Aono, Akira, to Micro-Computer Engineering Corporation. Semiconductor memory device. 4,587,638, Cl. 365-200.000.

Isogai, Masato; Iwasaki, Kishiro; and Nakano, Fumio, to Hitachi, Ltd. Optical modulation element with surface parallel and unidirectional alignment of LC. 4,586,791, Cl. 350-341.000.

Isoguchi, Seiichi; and Takahashi, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Camera range finder. 4,586,806, Cl. 354-403.000.

Isomura, Shigenori; and Kaji, Yasumasa, to Nippondenso Co., Ltd. Electronic fuel injection control with variable injection intervals. 4,586,479, Cl. 123-492.000.

Isuzu Motors, Ltd.: *See—*
Horada, Osamu; and Anda, Yasusuke, 4,586,471, Cl. 123-399.000.

Itakura, Kazuharu; Matsumura, Fukuo; and Uejima, Hideyuki, to NEC Corporation. Thermal columnar-aligned, plural-heaters print head. 4,587,529, Cl. 346-76.0PH.

Ito, Hiroaki: *See—*
Miyake, Haruhisa; Ito, Hiroaki; Suzuki, Koji; and Yamada, Ryoji, 4,586,992, Cl. 204-98.000.

Ito, Naohisa: *See—*
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,095, Cl. 419-13.000.
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,174, Cl. 428-552.000.

Ito, Norifumi: *See—*
Matsubara, Tetsuyuki; Ito, Norifumi; Ichikawa, Kouzo; Arahari, Kouichi; and Maeda, Tetsuo, 4,587,294, Cl. 525-53.000.

Ito, Susumu: *See—*
Nakashima, Seiichiro; Inagaki, Shigemi; and Ito, Susumu, 4,586,868, Cl. 414-735.000.

Ito, Tetsuro: *See—*
Yagi, Hiroshi; Harada, Yoshio; and Ito, Tetsuro, 4,586,544, Cl. 140-105.000.

Ito, Toshihisa: *See—*
Hanai, Kazuko; Yoneyama, Takashi; and Ito, Toshihisa, 4,587,170, Cl. 428-425.900.

Itoh, Akio: *See—*
Hara, Kenji; Nagahori, Yukihiro; Watanabe, Tsugio; Itoh, Akio; and Izumi, Hikoshi, 4,586,838, Cl. 400-320.000.

Itoh, Yokichi: *See—*
Yatsuda, Yuji; Hagiwara, Takaaki; Kondo, Ryuji; Minami, Shinichi; and Itoh, Yokichi, 4,586,238, Cl. 29-571.000.

ITT Corporation: *See—*
Goldman, Stuart O., 4,587,652, Cl. 370-110.100.

ITT Industries, Inc.: *See—*
Belart, Juan, 4,586,591, Cl. 188-358.000.
Thiel, Rudolf, 4,586,427, Cl. 91-369.00A.

Ivancic, Bonnie M.: *See—*
Carlson, Richard C.; DeRespiris, Donald L.; Sacco, Anthony R.; Groszek, Donald J.; and Ivancic, Bonnie M., 4,586,562, Cl. 165-134.100.

Ivie, Randall G.; and Thomason, William H., to Conoco Inc. Apparatus for adhesion testing of coatings. 4,586,371, Cl. 73-150.00A.

Iwagami, Fusao, to Sharp Kabushiki Kaisha. Paper guiding device for printer. 4,586,839, Cl. 400-619.000.

Iwamoto, Tadashi; and Tokura, Kimihide, to Tokyo Shibaura Denki Kabushiki Kaisha. Magnetic tape recorder/player. 4,587,582, Cl. 360-93.000.

Iwamoto, Taro: *See—*
Hosoda, Yuji; Kojima, Yoshio; Fujie, Masakatsu; Honma, Kazuo; Iwamoto, Taro; Nakano, Yoshiyuki; and Kamejima, Kohji, 4,586,335, Cl. 60-528.000.

Iwasaki, Kishiro: *See—*
Isogai, Masato; Iwasaki, Kishiro; and Nakano, Fumio, 4,586,791, Cl. 350-341.000.

Iwata, Hideyuki: *See—*
Fukuchi, Hisashi; Inui, Masaki; and Iwata, Hideyuki, 4,586,395, Cl. 74-467.000.

Iwata, Toshio: *See—*
Takahashi, Akira; Danno, Yoshiaki; Iida, Kazumasa; and Iwata, Toshio, 4,586,475, Cl. 123-425.000.

Iwatani, Kouji: *See—*
Nakagawa, Yuzo; Iwatani, Kouji; and Kadono, Tetsuro, 4,587,020, Cl. 210-658.000.

Izukawa, Kazuhiro: *See—*
Okumura, Ichiro; and Izukawa, Kazuhiro, 4,587,452, Cl. 310-328.000.

Izumi, Eiki: *See—*
Watanabe, Hiroshi; Izumi, Eiki; Aoyagi, Yukio; Honma, Kazuo; and Nakajima, Kichio, 4,586,330, Cl. 60-421.000.

Izumi, Hikoshi: *See—*
Hara, Kenji; Nagahori, Yukihiro; Watanabe, Tsugio; Itoh, Akio; and Izumi, Hikoshi, 4,586,838, Cl. 400-320.000.

Izumi, Shigeru; Michiguchi, Yoshihiro; and Senoh, Makoto, to Hitachi, Ltd. Unknown sound evaluating method and apparatus. 4,586,378, Cl. 73-572.000.

Izzard, Patrick A.: *See—*
Cairns, John F.; Denton, David A.; and Izzard, Patrick A., 4,587,001, Cl. 204-290.00R.

J. P. Tool Limited: *See—*
Rawle, Ralph H., 4,586,855, Cl. 407-55.000.

J. T. Province S.A.: *See—*
Tagiasco, Jean P., 4,586,297, Cl. 52-1.000.

Jackson, Thomas N., to International Business Machines Corporation. Vertical MESFET with mesa step defining gate length. 4,587,540, Cl. 357-22.000.

Jacobson, Chester F., to Gillette Company, The. Razor blade assembly. 4,586,255, Cl. 30-41.000.

Jacobson, Kenneth: *See—*
Goodman, Murray; Castagnoli, Neal; Jacobson, Kenneth; Melmon, Kenneth L.; Rosenkranz, Roberto P.; and Verlander, Michael S., 4,587,046, Cl. 530-330.000.

Jaeger, Warren V. Vacuum insulating window and reflector. 4,586,289, Cl. 49-64.000.

Jaffa, David; and Szarka, Sandor, to Precision Screen Machines, Inc. Over the edge printing apparatus with cleaner. 4,586,433, Cl. 101-123.000.

Jakobsen, Kjell M., to Platmanufaktur AB. Method of manufacture of a multilayer container of plastic material. 4,587,073, Cl. 264-515.000.

Jameson, Robert C., to Baker Oil Tools, Inc. Subterranean well tool with pressure-equalizing release. 4,586,567, Cl. 166-121.000.

Japan Life Co., Ltd.: *See—*
Shibata, Yoshikazu, 4,586,455, Cl. 116-67.00R.

Japan Styrene Paper Corporation: *See—*
Kuwabara, Hideki; and Sudo, Yoshimi, 4,587,270, Cl. 521-58.000.

Jartoux, Pierre; and Brondeau, Christian, to Freyssinet International. Processes and devices for prestressing concrete works and to the corresponding works. 4,586,303, Cl. 52-309.160.

Jastrzebski, Lubomir L.: *See—*
Blackstone, Scott C.; Jastrzebski, Lubomir L.; and Corboy, John F., Jr., 4,586,240, Cl. 29-571.000.

Jauchen, Peter: *See—*
Gleichenhagen, Peter; Behrend, Ekkehard; and Jauchen, Peter, 4,587,152, Cl. 428-195.000.

Jeanson, Rene H., to Valeo. Trailer for taking a boat out of the water and transporting it. 4,586,725, Cl. 280-414.100.

Jeco Co., Ltd.: *See—*
Hara, Kenji; Nagahori, Yukihiro; Watanabe, Tsugio; Itoh, Akio; and Izumi, Hikoshi, 4,586,838, Cl. 400-320.000.

Jelinek, Nikolaus: *See—*
Becherer, Walter; Geyken, Erwin; Jelinek, Nikolaus; Lechner, Franz; and Schausberger, Helmut, 4,586,311, Cl. 53-381.00R.

Jennings, Harriet E., to U.S. Plywood Corporation. Wall panel. 4,586,308, Cl. 52-393.000.

Jensen, Brian J.: *See—*
Hergenrother, Paul M.; and Jensen, Brian J., 4,587,312, Cl. 525-535.000.

Jensen, Ole R., to E. R. Squibb & Sons, Inc. Irrigation sleeve and attachment therefor. 4,586,927, Cl. 604-342.000.

Jeol Ltd.: *See—*
Uemura, Eisuke, 4,587,431, Cl. 250-442.100.

JOBO Labortechnik GmbH & Co. KG: *See—*
Bockemuhl-Simon, Johannes J.; Bernhardt, Rainer; and Kremer, Walter, 4,586,805, Cl. 354-323.000.

Jodice, Ronald E.: *See—*
Avakian, Roger W.; and Jodice, Ronald E., 4,587,272, Cl. 521-86.000.

Johannesburg Construction Corporation (PTY) Ltd.: *See—*
Bock, Immo E., 4,586,435, Cl. 102-202.500.

Johansson, Bjorn-Olow: *See—*
Hallstrom, Bengt; Olsson, Olle; Bolmstedt, Ulf; and Johansson, Bjorn-Olow, 4,586,565, Cl. 165-167.000.

Johns Hopkins University, The: *See—*
Miller, Paul S.; and Ts'O, Paul O. P., 4,587,044, Cl. 530-211.000.

Johnson, Constance A.; and Merijanian, Aspet V., to Uniroyal Chemical Company, Inc. Method for embedding electrical and electronic circuitry. 4,587,140, Cl. 427-372.200.

Johnson, Forrest T., to Westinghouse Electric Corp. Compartmentalized safety coolant injection system. 4,587,080, Cl. 376-282.000.

Johnson, Gerald R., to Doboy Packaging Machinery, Inc. Rotary tin-tie cutting mechanism for a packaging machine. 4,586,412, Cl. 83-205.000.

Johnson, Graham C.; and Noakes, Timothy J., to Imperial Chemical Industries PLC. Malfunction detector for electrostatic spraying apparatus. 4,586,657, Cl. 239-691.000.

Johnson & Johnson Baby Products Company: *See—*
Verdicchio, Robert J., 4,587,266, Cl. 514-635.000.

Johnson, Robert G.: *See—*
Bonne, Ulrich; and Johnson, Robert G., 4,587,105, Cl. 422-98.000.

Johnson, Shepard D.; French, Andrew; Ellis, Allan E.; Hedrick, Dennis R.; and Helfenberger, Charles D., to International Business Machines Corp. Ink ribbon cartridge indication system for printer. 4,586,837, Cl. 400-216.200.

Johnston, Damon A.; and Garcia, George L., to Suncast Corporation. Garden hose storage apparatus having hose guide. 4,586,676, Cl. 242-86.000.

Jones, Carl E., to Penn United Technology, Inc. Method and apparatus for forming stacks of laminated metallic members. 4,586,236, Cl. 29-564.600.

Jones, Geraint: *See—*
Arnould, Jean C.; Evans, John R.; Jones, Geraint; and Thomson, David S., 4,587,262, Cl. 514-548.000.

Jones, Kendall, to TA Mfg., Inc. Coupling assembly. 4,586,694, Cl. 251-149.200.

Jones, LeRoy, Sr.: *See—*
Williams, Donald H.; and Jones, LeRoy, Sr., 4,586,916, Cl. 493-10.000.

Jones, Richard H. Rotary expansion tool for reaming frustoconical undercuts in the walls of cylindrical holes. 4,586,573, Cl. 175-285.000.

Josef Nittel GmbH & Co KG: *See—*
Nittel, Walter F., 4,586,628, Cl. 220-470.000.

Josefsson, Claes G.; and Andersson, Rolf, to Glace-Bolaget AB; and AB Akerlund & Rausing. Packing trough and blank therefor. 4,586,648, Cl. 229-114.000.

Joseph, Eric D.: *See—*
Gray, Randall C.; and Joseph, Eric D., 4,587,442, Cl. 307-350.000.

Jotatsu, Masao: *See—*
Tanaka, Takeshi; Jotatsu, Masao; Higaki, Masaaki; Hamada, Toshimasa; Hashikawa, Tadashi; Ohashi, Toneri; and Togawa, Seigo, 4,586,664, Cl. 241-213.000.

Joubert, James I., to United States of America, Energy. Removal of sulfur and nitrogen containing pollutants from discharge gases. 4,587,113, Cl. 423-244.000.

Jourdan-Laforte, Eric; and Le Rouzic, Daniel, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Disinfection and sterilizing solution of peracetic acid and nitric acid. 4,587,264, Cl. 514-557.000.

Juechter, Tadge J., to General Motors Corporation. Telescoping window stabilizing mechanism. 4,586,290, Cl. 49-348.000.

Juenger, Rudolf, to Akzona Incorporated. Cleaning control through measurement of electrical conductivity. 4,586,523, Cl. 134-113.000.

JuJo Paper Co., Ltd.: *See—*
Sasaki, Kazuo; Nishiguchi, Yoichi; and Saito, Shinzo, 4,586,650, Cl. 229-137.000.

Jun-Ichi Nishizawa: *See—*
Imai, Masaharu; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,587,562, Cl. 358-212.000.

Jurgensmeyer, Willi; Honsberg, Friedrich-Wilhelm; and Halbach, Kurt, to Dako-Werkzeugfabriken David Kotthaus GmbH & Co. KG. Method of and apparatus for the fine cutting (punching) of articles. 4,586,360, Cl. 72-328.000.

Kabushiki Gaisha Sanko: *See—*
Uchida, Mitsunobu, 4,586,202, Cl. 4-242.000.

Kabushiki Kaisha Bandai: *See—*
Murakami, Katsushi, 4,586,911, Cl. 446-376.000.

Kabushiki Kaisha Daikin Seisakusho: *See—*
Mori, Mituyoshi, 4,586,592, Cl. 192-49.000.

Kabushiki Kaisha Kobe Seiko Sho: *See—*
Mori, Takasuke; Miyazaki, Jun; Miyamoto, Manabu; and Narita, Kiichi, 4,586,558, Cl. 164-440.000.
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, 4,587,098, Cl. 422-7.000.
Tanaka, Takeshi; Jotatsu, Masao; Higaki, Masaaki; Hamada, Toshimasa; Hashikawa, Tadashi; Ohashi, Toneri; and Togawa, Seigo, 4,586,664, Cl. 241-213.000.

Kabushiki Kaisha Maki Seisakusho: *See—*
Horii, Taichi, 4,586,613, Cl. 209-556.000.

Kabushiki Kaisha Morita Seisakusho: *See—*
Hotta, Toshihiro, 4,587,468, Cl. 318-362.000.

Kabushiki Kaisha Sankyo Seiki Seisakusho: *See—*
Oguchi, Yukio, 4,587,618, Cl. 364-513.000.

Kabushiki Kaisha Tokai Rika Denki Seisakush: *See—*
Kokubu, Sadao, 4,586,397, Cl. 74-492.000.

Kabushiki Kaisha Toshiba: *See—*
Hachisuga, Takaaki; Takahashi, Tomohiko; Kagaya, Koji; and Nagashima, Masayoshi, 4,586,834, Cl. 400-120.000.
Ide, Fumito, 4,586,813, Cl. 355-50.000.
Kanuma, Akira, 4,587,445, Cl. 307-443.000.
Kohyama, Mitsuaki; and Shimazaki, Takashi, 4,586,460, Cl. 118-653.000.
Sanada, Masashi, 4,587,606, Cl. 363-68.000.

Kadono, Masahiro: *See—*
Kouyama, Kazumi; Deguchi, Takashi; Kadono, Masahiro; and Harada, Shigeki, 4,587,605, Cl. 363-41.000.

Kadono, Tetsuro: *See—*
Nakagawa, Yuzo; Iwatani, Kouji; and Kadono, Tetsuro, 4,587,020, Cl. 210-658.000.

Kadowaki, Takashi; and Onodera, Kaoru, to Konishiroku Photo Industry Co., Ltd. Color photographic light-sensitive material. 4,587,208, Cl. 430-507.000.

Kagaya, Koji: *See—*
Hachisuga, Takaaki; Takahashi, Tomohiko; Kagaya, Koji; and Nagashima, Masayoshi, 4,586,834, Cl. 400-120.000.

Kagitani, Yoshio; Ueda, Yasuo; Munechika, Kozi; Morimoto, Satoshi; Komeda, Shirou; Tanaka, Kenji; and Yokoyama, Kazumasa, to Green Cross Corporation, The. Fibronectin-dextran-drug complex and method of preparation thereof. 4,587,122, Cl. 424-101.000.

Kagitani, Yoshio: *See—*
Ueda, Yasuo; Shiraga, Yusei; Morimoto, Satoshi; Kagitani, Yoshio; Funakoshi, Satoshi; and Suyama, Tadakazu, 4,587,052, Cl. 260-239.30T.

Kahan, Jeno. Triple needle height selection means for knitting machines. 4,586,353, Cl. 66-230.000.

Kaifu, Katsuaki: *See—*
Kato, Masakazu; Nishioka, Yoichi; and Kaifu, Katsuaki, 4,587,188, Cl. 430-58.000.

Kaiser Aluminum & Chemical Corporation: *See—*
Finnegan, Walter D.; and Woods, Ralph A. A., 4,586,964, Cl. 148-11.50A.

Kaith, Irving: *See—*
Fakler, Lyle D.; and Kaith, Irving, 4,586,226, Cl. 29-157.00R.

Kaji, Yasumasa: *See—*
Isomura, Shigenori; and Kaji, Yasumasa, 4,586,479, Cl. 123-492.000.

Kaletzky, Esther. Surgical bandage disposable coupling device. 4,586,499, Cl. 128-171.000.

Kalina, Alexander I. Method and apparatus for implementing a thermodynamic cycle using a fluid of changing concentration. 4,586,340, Cl. 60-673.000.

Kamejima, Kohji: *See—*
Hosoda, Yuji; Kojima, Yoshio; Fujie, Masakatsu; Honma, Kazuo; Iwamoto, Taro; Nakano, Yoshiyuki; and Kamejima, Kohji, 4,586,335, Cl. 60-528.000.

Kami Kubo, Fumio: *See—*
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, 4,587,098, Cl. 422-7.000.

Kamijo, Tetsuhide: *See—*
Iizuka, Kinji; Kamijo, Tetsuhide; Yamamoto, Ryoji; and Harada, Hiromu, 4,587,356, Cl. 562-455.000.

Kaminski, Joan M.: *See—*
Horodysky, Andrew G.; and Kaminski, Joan M., 4,587,025, Cl. 252-34.000.

Kamio, Takayoshi: *See—*
Ono, Michio; Morigaki, Masakazu; Kamio, Takayoshi; Aoki, Kozo; and Furuya, Kazuhiko, 4,587,210, Cl. 430-555.000.

Kanai, Seita: *See—*
Tokunaga, Toshimichi; and Kanai, Seita, 4,586,728, Cl. 280-707.000.

Kanaizumi, Masaru: *See—*
Miyagi, Morio; Ohno, Makoto; and Kanaizumi, Masaru, 4,587,168, Cl. 428-369.000.

Kanamori, Takashi; Shibata, Susumu; Sawai, Hideo; and Kuroki, Kenji, to OKI Electric Industry Co., Inc. Thermal head. 4,587,400, Cl. 219-216.000.

Kanao, Shiro. Flexible hose. 4,587,145, Cl. 428-36.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
Samejima, Yasushi; Shiga, Minoru; Kano, Toshiji; Yamada, Kiyoshi; and Nishio, Tsutomu, deceased, 4,586,994, Cl. 204-98.000.

Kaneko, Tamaki; Takahashi, Yasuhiro; Okuzawa, Tsugio; Nakamura, Isao; and Ebata, Kohshi, to Ricoh Company, Ltd. Copying apparatus. 4,586,812, Cl. 355-24.000.

Kaneko, Yutaka: *See—*
Sakuma, Nobuo; and Kaneko, Yutaka, 4,586,782, Cl. 350-6.500.

Kanii, Norikazu: *See—*
Ohkoshi, Fumihiko; Hasegawa, Toshifumi; and Kanii, Norikazu, 4,586,860, Cl. 409-233.000.

Kannan, Raghavachari: *See—*
Stephenson, Edward J.; and Kannan, Raghavachari, 4,586,718, Cl. 277-22.000.

Kano, Toshiji: *See—*
Samejima, Yasushi; Shiga, Minoru; Kano, Toshiji; Yamada, Kiyoshi; and Nishio, Tsutomu, deceased, 4,586,994, Cl. 204-98.000.

Kanto Yakin Kogyo K.K.: *See—*
Takahashi, Susumu, 4,586,899, Cl. 432-148.000.

Kanuma, Akira, to Kabushiki Kaisha Toshiba. Data output circuit with means for preventing more than half the output lines from transitioning simultaneously. 4,587,445, Cl. 307-443.000.

Kao Corporation: *See—*
Iizuka, Masanori; and Tanaka, Hideki, 4,586,960, Cl. 106-90.000.
Kurosaki, Tomihiro; and Nishikawa, Norio, 4,587,063, Cl. 556-146.000.

Kappl, Gerhard: *See—*
Bierleutgeb, Fritz; and Kappl, Gerhard, 4,586,794, Cl. 350-520.000.

Kaptan APS: *See—*
Friberg, Svend; Korsgaard, Peter; and Worsoe-Schmidt, Peder, 4,586,345, Cl. 62-235.100.

Karden, Karl G.: *See—*
Berger, Karl G.; and Karden, Karl G., 4,586,884, Cl. 418-43.000.

Karish, John A.: *See—*
Wedertz, Larry D.; Leslie, David L.; and Karish, John A., 4,586,681, Cl. 244-49.000.

Karlberg, Rolf E.: *See—*
Carlsson, Per-Olov A. V.; and Karlberg, Rolf E., 4,586,925, Cl. 604-251.000.

Karmel, Amir, to General Motors Corporation. Flow control valve. 4,586,536, Cl. 137-599.000.

Kasai, Yoshio: *See—*
Ohtomo, Seiya; Aoki, Minoru; and Kasai, Yoshio, 4,587,072, Cl. 264-297.800.

Kasper, Dean J.: *See—*
Patton, James C.; Bennet, Richard G.; Kasper, Dean J.; and Wisakowsky, Eugene E., 4,587,126, Cl. 426-19.000.

Kasperkovitz, Wolfdietrich G.; and Dullemond, Dirk J., to U.S. Philips Corporation. Temperature-compensated current source having current and voltage stabilizing circuits. 4,587,478, Cl. 323-316.000.

Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. Handcart handle height adjusting mechanism. 4,586,399, Cl. 74-551.300.

Kast, Hans: *See—*
Dotzauer, Bernhard; Kast, Hans; Franzmann, Gernot; Ley, Gregor; Beckerle, Wilhelm F.; and Schilder, Wolfgang, 4,587,278, Cl. 523-200.000.

Kataoka, Fumio: *See*—
Kojima, Mithumasa; Kataoka, Fumio; Shoji, Fusaji; and Yokono, Hitoshi, 4,587,197, Cl. 430-196.000.
Kataoka, Masayuki: *See*—
Morikawa, Takao; Kobayasi, Tosio; Kataoka, Masayuki; and Mori, Atsushi, 4,587,201, Cl. 430-284.000.
Kataoka, Yoshiro: *See*—
Nishimura, Kosuke; and Kataoka, Yoshiro, 4,587,409, Cl. 235-380.000.
Katayama, Hirohiko: *See*—
Matsuoka, Mikiharu; Katayama, Hirohiko; and Horyu, Sakae, 4,587,663, Cl. 377-2.000.
Kato Hatsujo Kaisha, Limited: *See*—
Matsui, Tatsuhiko; Aida, Hiroyuki; Watanabe, Akira; and Oohazama, Tsuneyoshi, 4,586,579, Cl. 180-69.210.
Kato, Heizaburo, to Sankyo Manufacturing Company, Ltd. Output rotational angle indicating device of rocking rotational angle altering system. 4,586,259, Cl. 33-1.0PT.
Kato, Junichi: *See*—
Yokotani, Yoichirou; Kato, Junichi; Nishida, Masamitsu; Ouchi, Hiromu; and Nitta, Tsuneharu, 4,586,972, Cl. 156-89.000.
Kato, Kimio: *See*—
Kato, Yoshio; Nagamathu, Toshihiro; Tsurumi, Kazufumi; Nakayama, Shozo; and Kato, Kimio, 4,586,876, Cl. 417-269.000.
Kato, Masakazu; Nishioka, Yoichi; and Kaifu, Katsuaki, to Oki Electric Industry Co., Ltd. Phthalocyanine photoconductor for electrophotography. 4,587,188, Cl. 430-58.000.
Kato, Mitsumi; and Futamase, Tsuyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instruments provided with reverberation tone generating apparatus. 4,586,417, Cl. 84-1.170.
Kato, Mitsuo: *See*—
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.
Kato, Motokazu: *See*—
Matsumoto, Toshio; and Kato, Motokazu, 4,587,654, Cl. 371-14.000.
Kato, Takashi: *See*—
Nakayama, Kiyoshi; Kato, Takashi; Sekiguchi, Tatsuo; Satoh, Mamoru; and Hayakawa, Koshiro, 4,586,348, Cl. 62-277.000.
Kato, Toshio: *See*—
Shimizu, Shigeo; Kato, Toshio; Oda, Hitoshi; and Shigeta, Masanobu, 4,587,178, Cl. 428-615.000.
Kato, Yasuo: *See*—
Ono, Tetsuo; Watanabe, Yoshio; Matsuno, Hiromitsu; Kato, Yasuo; Murayama, Seiichi; and Moshiba, Shigeo, 4,587,453, Cl. 313-25.000.
Kato, Yoshio; Nagamathu, Toshihiro; Tsurumi, Kazufumi; Nakayama, Shozo; and Kato, Kimio, to Taiho Kogyo Co., Ltd. Inclined disc type fluid compressor. 4,586,876, Cl. 417-269.000.
Katsumata, Tooru; Terashima, Kazutaka; Nakajima, Hiroaki; and Fukuda, Tsuneo, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Method for manufacture of III-V group compound semiconductor single crystal. 4,586,979, Cl. 156-601.000.
Katz, Harry R. Needle inserting instrument means for interstitial radiotherapy. 4,586,490, Cl. 128-1.100.
Kaufman, Arnold S., to National Air Systems, Inc. Multilevel air distribution panel for air ventilation hood. 4,586,486, Cl. 126-299.00D.
Kaul, Bal K.: *See*—
Franco, Robert J.; Berkowitz, Barry J.; and Kaul, Bal K., 4,586,561, Cl. 165-1.000.
Kawahara, Atsushi: *See*—
Kudo, Koichi; Ogawa, Hidehiro; and Kawahara, Atsushi, 4,587,416, Cl. 250-204.000.
Kawai, Ryoichi: *See*—
Shirakoshi, Hiroshi; Matsumoto, Masafumi; Kawai, Ryoichi; and Kotani, Matahira, 4,587,418, Cl. 250-216.000.
Kawamura, Fumio; Kikuchi, Makoto; and Funabashi, Kiyomi, to Hitachi, Ltd. Inorganic adsorbent and process for production thereof. 4,587,232, Cl. 502-400.000.
Kawana, Fumihiro: *See*—
Ohta, Masutomi; and Kawana, Fumihiro, 4,587,521, Cl. 340-825.300.
Kawana, Takeshi: *See*—
Murai, Toshiaki; Kawana, Takeshi; and Asano, Toshio, 4,586,247, Cl. 29-705.000.
Kawasaki, Brian S.: *See*—
Tremblay, Yves; Kawasaki, Brian S.; and Bilodeau, Francois, 4,586,784, Cl. 350-96.150.
Kawasaki Steel Corporation: *See*—
Obara, Takashi; Osawa, Kazunori; Nishida, Minoru; Sakata, Kei; and Kuguminato, Hideo, 4,586,965, Cl. 148-12.00D.
Kawashima, Katsuyuki: *See*—
Azekura, Kazuo; Kawashima, Katsuyuki; Inoue, Kotaro; and Uchikawa, Sadao, 4,587,078, Cl. 376-267.000.
Kawasumi, Kenichi: *See*—
Murayama, Seiichi; Yasuda, Makoto; Miyashita, Tsune; Arai, Yoji; Kawasumi, Kenichi; and Kinoshita, Kazunori, 4,587,460, Cl. 315-174.000.
Kawite Packaging Pty. Ltd.: *See*—
White, Neil D., 4,586,549, Cl. 141-67.000.
Keefer, Keith D.; and Michalske, Terry A., to United States of America, Energy. Glass ceramic toughened with tetragonal zirconia. 4,587,224, Cl. 501-4.000.
Keighley Grinders (Machine Tools) Limited: *See*—
Shackleton, Raymond T., 4,586,294, Cl. 51-105.0SP.
Keith, Donald G., to A.A.R.C. (Management) Pty. Limited. Reticulated products and their manufacture. 4,587,147, Cl. 428-59.000.
Kelemen, Jozsef: *See*—
Budai, Zoltan; Benko, Pal; Ratz nee Simonek, Ildiko ; Rakoczy nee Pinter, Eva; Magyar, Karoly; Kelemen, Jozsef; and Mandi, Attila, 4,587,261, Cl. 514-542.000.
Keller, Anthony F.; and Marvin, Dennis F., to Motorola, Inc. Low-power low-harmonic transistor oscillator. 4,587,497, Cl. 331-116.00R.
Keller, Arnold, to Waldemar Link GmbH & Co. Surgical chisel. 4,586,496, Cl. 128-92.00E.
Keller, Teddy M., to United States of America, Navy. Processable and stable conductive polymers from diether-linked bisorthodinitrile monomers. 4,587,325, Cl. 528-172.000.
Kellerman, David: *See*—
Kellerman, Hillel; Kellerman, David; and Box, Leonard J., 4,587,144, Cl. 428-36.000.
Kellerman, Hillel; Kellerman, David; and Box, Leonard J. Low loss, compression, hermetic glass-to-metal-seal and method. 4,587,144, Cl. 428-36.000.
Kellison, Roger C. Method and apparatus for rebar avoidance. 4,586,846, Cl. 404-6.000.
Kelly, Guy M.: *See*—
Roes, John B.; Winkles, Billy B.; Kelly, Guy M.; Spani, Wayne M.; and Schuster, Donald W., 4,587,434, Cl. 250-556.000.
Kelman, Charles D. Intraocular lens and method of preparing the same for insertion into a human eye. 4,586,930, Cl. 623-6.000.
Kempsmith Machine Co.: *See*—
Robinson, Daniel T., 4,586,917, Cl. 493-241.000.
Kendall Company, The: *See*—
Howey, Jon A., 4,586,606, Cl. 206-313.000.
White, Roger N., 4,586,196, Cl. 2-114.000.
Kendall, Jerry A.: *See*—
Ammon, J. Preston; Kendall, Jerry A.; and Martens, John D., 4,586,254, Cl. 29-884.000.
Kennedy, Donald E.: *See*—
Barrell, David; Kennedy, Donald E.; and Rollen, Donald C., 4,587,161, Cl. 428-288.000.
Kennedy, Joe H.; Holland, A. Ronald; Richey, Thomas; and Alsup, James D., Jr., to Syntex (U.S.A.) Inc. Door and drawer front having a recessed grasping surface. 4,586,762, Cl. 312-330.00R.
Kennelly, Patric M.: *See*—
Walter, Leo; Ring, Charles E.; Seppala, Bryan R.; Kennelly, Patric M.; and Marnie, James P., 4,586,778, Cl. 339-221.00R.
Kerker, Richard, to McDonnell Douglas Corporation. Rolling aerial refueling boom. 4,586,683, Cl. 244-135.00A.
Kern, Josef; Bardong, Helmut; Humpolik, Bohumil; and Staffa, Karl-Heinz, to Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. KG. Arrangement for joining the tubes of a heat exchanger core with a connecting box particularly for evaporators. 4,586,566, Cl. 165-173.000.
Kettler, Hans: *See*—
Diener, Arnulf; Kettler, Hans; and Tenhaven, Ulrich, 4,587,135, Cl. 427-13.000.
Keve, Tibor: *See*—
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.
Key Pharmaceuticals, Inc.: *See*—
Hsiao, Chiin H., 4,587,118, Cl. 424-19.000.
Kezuka, Seiju: *See*—
Yamaoka, Noboru; Kezuka, Seiju; Iida, Moriya; Miyoshi, Mituji; and Matsuura, Kazuo, 4,587,039, Cl. 252-511.000.
Kikkoman Corporation: *See*—
Akao, Takeshi; Nagata, Shuichi; Osaki, Katsumichi; and Okamoto, Yoshiharu, 4,587,127, Cl. 426-46.000.
Kikuchi, Makoto: *See*—
Kawamura, Fumio; Kikuchi, Makoto; and Funabashi, Kiyomi, 4,587,232, Cl. 502-400.000.
Kikuma, Yosiro: *See*—
Hatakeyama, Yoshiharu; and Kikuma, Yosiro, 4,586,623, Cl. 215-301.000.
Kilner, Peter H.; Egan, Joseph P., Jr.; Ceisel, Stephen G.; and Schammel, Wayne P., to Amoco Corporation. Process for the production of trimellitic anhydride. 4,587,350, Cl. 549-245.000.
Kim, Bang M., to General Electric Company. Effluent gas desulfurization with conversion to gypsum of large particle size. 4,587,112, Cl. 423-242.000.
Kim, Jeong R. Top guide for open-face reel. 4,586,285, Cl. 43-24.000.
Kim, Syng N., to Wico Corporation. Position control device with dual manual controls. 4,587,419, Cl. 250-221.000.
Kim, Syng N., to Wico Corporation. Analog joystick controller. 4,587,510, Cl. 338-128.000.
Kim, Tuk M. Composition for treating cutaneous wounds. 4,587,124, Cl. 424-195.100.
Kimberly-Clark Corporation: *See*—
Hotchkiss, Harry W.; Fields, Robert D.; and Rolsten, Gina K., 4,587,154, Cl. 428-195.000.
Kimura, Kunio: *See*—
Ohno, Eiji; Kimura, Kunio; Yamada, Noboru; and Akahira, Nobuo, 4,587,209, Cl. 430-526.000.
Kimura, Miyoshi: *See*—
Kishimoto, Munehisa; Sakata, Noboru; Kimura, Miyoshi; Fujiwara, Kouichi; and Komura, Hidekazu, 4,586,789, Cl. 350-336.000.

King Instrument Corporation: *See—*
King, James L.; and Woodley, George M. (said George M. Woodley assors. to), 4,586,672, Cl. 242-56.00R.

King, James L.; and Woodley, George M., to King Instrument Corporation, by said George M. Woodley. Machine for loading cassettes. 4,586,672, Cl. 242-56.00R.

King, Martin J., to Baxter Travenol Laboratories, Inc. Monitor and control system for water purification apparatus. 4,587,518, Cl. 340-603.000.

Kinoshita, Hiromi; Fujiwara, Kouji; and Maeda, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Apparatus for mounting electric parts. 4,586,251, Cl. 29-741.000.

Kinoshita, Kazunori: *See—*
Murayama, Seiichi; Yasuda, Makoto; Miyashita, Tsune; Arai, Yoji; Kawasumi, Kenichi; and Kinoshita, Kazunori, 4,587,460, Cl. 315-174.000.

Kinoshita, Takao: *See—*
Tsunekawa, Tokuichi; Sakai, Shinji; and Kinoshita, Takao, 4,587,415, Cl. 250-204.000.

Kioritz Corporation: *See—*
Nagashima, Akira; and Taomo, Toshio, 4,586,588, Cl. 188-77.00R.
Yokocho, Yoetsu; and Tanaka, Hiroyuki, 4,586,322, Cl. 56-12.700.

Kirchner, Edward C.: *See—*
Goldenberg, Philip H.; Neuf, George J.; and Kirchner, Edward C., 4,586,662, Cl. 241-102.000.

Kirsch, Wolff M.; Hua, Zhu Y.; and Cushman, Robert B., to University of New Mexico. Surgical microclip. 4,586,503, Cl. 128-334.00R.

Kishi, Hajimu; and Tanaka, Kunio, to Fanuc Ltd. Method of automatically creating numerical control data in one of a plurality of data formats. 4,587,608, Cl. 364-191.000.

Kishida, Eiji; and Hasegawa, Shumpei, to Honda Giken Kogyo Kabushiki Kaisha. Secondary air supply for internal combustion engine. 4,586,481, Cl. 123-587.000.

Kishimoto, Munehisa; Sakata, Noboru; Kimura, Miyoshi; Fujiwara, Kouichi; and Komura, Hidekazu, to Hitachi, Ltd. Liquid crystal display unit with particular electrode terminal groupings. 4,586,789, Cl. 350-336.000.

Kissei Pharmaceutical Co., Ltd.: *See—*
Iizuka, Kinji; Kamijo, Tetsuhide; Yamamoto, Ryoji; and Harada, Hiromu, 4,587,356, Cl. 562-455.000.

Kistner, John F., to Minnesota Mining and Manufacturing Company. Abrasion resistant coatings. 4,587,169, Cl. 428-413.000.

Kitagawa, Masataka: *See—*
Nakane, Yasuaki; Kitagawa, Masataka; Kiyomiya, Tadashi; and Yanada, Tetsunosuke, 4,587,533, Cl. 346-135.100.

Kitagawa, Yoshihiro, to Nippon Air Brake Co., Ltd. Load compensating valve with check valve. 4,586,754, Cl. 303-22.00R.

Kitagishi, Nozomu: *See—*
Suzuki, Takashi; Matsumura, Susumu; and Kitagishi, Nozomu, 4,586,786, Cl. 350-169.000.

Kitajima, Masao: *See—*
Amano, Yoshikazu; Arai, Fuminori; and Kitajima, Masao, 4,587,100, Cl. 422-56.000.

Kitano, Kissho: *See—*
Duvdevani, Ilan; Eckert, John A.; Schulz, Donald N.; and Kitano, Kissho, 4,586,937, Cl. 44-62.000.

Kitipornchai, Sritawat, to University of Queensland. Reinforcing timber. 4,586,550, Cl. 144-353.000.

Kittaka, Toshiharu: *See—*
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.

Kiyomiya, Tadashi: *See—*
Nakane, Yasuaki; Kitagawa, Masataka; Kiyomiya, Tadashi; and Yanada, Tetsunosuke, 4,587,533, Cl. 346-135.100.

Kizawa, Shinichi: *See—*
Morimoto, Kenji; Ikegami, Tamotsu; Naito, Masao; Kubo, Tateo; and Kizawa, Shinichi, 4,586,863, Cl. 413-14.000.

Klann, Holm: *See—*
Foller, Werner; and Klann, Holm, 4,586,655, Cl. 236-56.000.

Klauser, Rainer; Meinetsberger, Eike; and Bichlmayer, Klaus, to Luitpold-Werk Chemischpharmazeutische Fabrik GmbH & Co. Thiazaspirane derivatives, process for their preparation, and medicaments. 4,587,250, Cl. 514-278.000.

Kliment, Charles K., to National Patent Development Co. Hydrophilic gels containing high amounts of fragrance. 4,587,129, Cl. 426-534.000.

Klinger, Horst; Lehmann, Werner; and Zeuch, Michael, to Robert Bosch GmbH. Centrifugal speed governor for fuel-injected internal combustion engines. 4,586,470, Cl. 123-367.000.

Klipper, Reinhold: *See—*
Buysch, Hans-Josef; Klipper, Reinhold; Lange, Peter M.; and Mues, Peter, 4,587,347, Cl. 548-317.000.

Klockner, Alfred. Bed thickness levelling device for a cooling column. 4,586,270, Cl. 34-173.000.

Klockner-Humboldt-Deutz AG: *See—*
Corzilius, Rolf; Noack, Horst-Guenter; and Stollbrink, Johann, 4,586,872, Cl. 415-219.00C.

Kloeckner-Becorit GmbH: *See—*
Watermann, Willy, 4,586,851, Cl. 405-295.000.

Knight, David W.: *See—*
Allweier, Werner K.; and Knight, David W., 4,586,357, Cl. 72-137.000.

Knofel, Hartmut; and Brockelt, Michael, to Bayer Aktiengesellschaft. Diisocyanates of the diphenyl methane series and processes for the production thereof. 4,587,058, Cl. 560-347.000.

Knorr-Bremse GmbH: *See—*
Hintner, Joseph, 4,586,756, Cl. 303-37.000.

Knowles, Gregory W.: *See—*
Ciocca, Joseph A.; and Knowles, Gregory W., 4,586,985, Cl. 202-174.000.

Knuttel, Bertold: *See—*
Muller, Wolfgang; Knuttel, Bertold; and Laukien, Gunther, 4,587,490, Cl. 324-320.000.

Koala Technologies Corporation: *See—*
Moore, Cecil A., 4,587,378, Cl. 178-18.000.

Koba, Yositaka; Hayashi, Yoshiki; and Torikoshi, Kunikazu, to Daikin Kogyo Co., Ltd. Heating drum for radiant heater and method of manufacture thereof. 4,586,485, Cl. 126-248.000.

Kobayashi, Katsuya: *See—*
Shimizu, Hideaki; Kofune, Eiichi; Saitoh, Haruhisa; and Kobayashi, Katsuya, 4,587,022, Cl. 210-710.000.

Kobayashi, Masayoshi; Nozaki, Shinya; Yamada, Keiichi; and Kobayashi, Tadashi, to Diesel Kiki Co., Ltd. Electronically controlled distributor type fuel injection pump. 4,586,480, Cl. 123-506.000.

Kobayashi, Tadashi: *See—*
Kobayashi, Masayoshi; Nozaki, Shinya; Yamada, Keiichi; and Kobayashi, Tadashi, 4,586,480, Cl. 123-506.000.

Kobayasi, Tosio: *See—*
Morikawa, Takao; Kobayasi, Tosio; Kataoka, Masayuki; and Mori, Atsushi, 4,587,201, Cl. 430-284.000.

Koboshi, Shigeharu: *See—*
Ishikawa, Masao; Koboshi, Shigeharu; and Kuramatsu, Masayuki, 4,587,195, Cl. 430-139.000.

Kobus, John R. Twin engine synchronizer. 4,586,341, Cl. 60-711.000.

Koch, Theodore F.: *See—*
Mooney, Paul C.; and Koch, Theodore F., 4,586,393, Cl. 74-396.000.

Kochs Adler AG: *See—*
Raupach, Gunter, 4,586,449, Cl. 112-292.000.

Kofune, Eiichi: *See—*
Shimizu, Hideaki; Kofune, Eiichi; Saitoh, Haruhisa; and Kobayashi, Katsuya, 4,587,022, Cl. 210-710.000.

Kohler, Boris: *See—*
Ackermann, Peter; Gsell, Laurenz; and Kohler, Boris, 4,587,255, Cl. 514-345.000.

Kohyama, Mitsuaki; and Shimazaki, Takashi, to Kabushiki Kaisha Toshiba. Developing apparatus. 4,586,460, Cl. 118-653.000.

Koivula, Caj, to Akab of Sweden AB. Device for manufacturing of hemmed pieces of cloth cut from a web. 4,586,411, Cl. 83-175.000.

Kojima, Keiichi: *See—*
Ishise, Kojiro; and Kojima, Keiichi, 4,586,970, Cl. 156-48.000.

Kojima, Mithumasa; Kataoka, Fumio; Shoji, Fusaji; and Yokono, Hitoshi, to Hitachi, Ltd.; and Hitachi Chemical Co., Ltd. Flexible photosensitive polymer composition with azide and/or amine compound, poly(amic acid) and highly polar compound with boiling point above 150° C. 4,587,197, Cl. 430-196.000.

Kojima, Yoshio: *See—*
Hosoda, Yuji; Kojima, Yoshio; Fujie, Masakatsu; Honma, Kazuo; Iwamoto, Taro; Nakano, Yoshiyuki; and Kamejima, Kohji, 4,586,335, Cl. 60-528.000.

Kokta, Milan R., to Union Carbide Corporation. Process for enhancing $Ti:Al_2O_3$ tunable laser crystal fluorescence by annealing. 4,587,035, Cl. 252-301.40F.

Kokubu, Sadao, to Kabushiki Kaisha Tokai Rika Denki Seisakush. Steering wheel device. 4,586,397, Cl. 74-492.000.

Kolt, Stanley, to Suroff, Leonard W., a part interest. Energy saver damper assembly. 4,586,654, Cl. 236-49.000.

Komeda, Shirou: *See—*
Kagitani, Yoshio; Ueda, Yasuo; Munechika, Kozi; Morimoto, Satoshi; Komeda, Shirou; Tanaka, Kenji; and Yokoyama, Kazumasa, 4,587,122, Cl. 424-101.000.

Kominami, Seiya: *See—*
Asayama, Yoshiaki; and Kominami, Seiya, 4,586,476, Cl. 123-440.000.

Komiyama, Makoto: *See—*
Hirai, Hidefumi; Komiyama, Makoto; and Wada, Keiichiro, 4,587,114, Cl. 423-247.000.

Komori, Masanoshin: *See—*
Nishizawa, Tetuo; Asano, Seiji; Ishiguro, Minoru; Komori, Masanoshin; Tobioka, Takashi; Yoshida, Toshio; and Hara, Hiroshi, 4,586,801, Cl. 354-173.100.

Komornicki, Jacques: *See—*
Bauer, Denise; Komornicki, Jacques; and Tellier, Jacques, 4,587,106, Cl. 423-8.000.

Komura, Hidekazu: *See—*
Kishimoto, Munehisa; Sakata, Noboru; Kimura, Miyoshi; Fujiwara, Kouichi; and Komura, Hidekazu, 4,586,789, Cl. 350-336.000.

Kondo, Ryuji: *See—*
Yatsuda, Yuji; Hagiwara, Takaaki; Kondo, Ryuji; Minami, Shinichi; and Itoh, Yokichi, 4,586,238, Cl. 29-571.000.

Kondo, Shuzi; Hirose, Iwao; and Wakabayashi, Masayoshi, to Dainippon Screen Seizo Kabushiki Kaisha. Proofing apparatus. 4,586,978, Cl. 156-540.000.

Kondo, Takayasu: *See—*
Niimi, Koji; and Kondo, Takayasu, 4,587,620, Cl. 364-574.000.

Kondou, Makoto: *See—*
Tanaka, Chiaki; Kondou, Makoto; and Yamamoto, Yoshiyuki, 4,587,309, Cl. 525-419.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
Ishikawa, Masao; Koboshi, Shigeharu; and Kuramatsu, Masayuki, 4,587,195, Cl. 430-139.000.

Isoguchi, Seiichi; and Takahashi, Hiroshi, 4,586,806, Cl. 354-403.000.
Kadowaki, Takashi; and Onodera, Kaoru, 4,587,208, Cl. 430-507.000.
Kontoghiorghes, George: *See—*
Hider, Robert C.; Kontoghiorghes, George; Silver, Jack; and Stockham, Michael A., 4,587,240, Cl. 514-188.000.
Kopp, Richard; Meyborg, Holger; Grogler, Gerhard; and Schwindt, Jurgen, to Bayer Aktiengesellschaft. Process for the preparation of polyurethane elastomers. 4,587,275, Cl. 521-163.000.
Koppers, Manfred: *See—*
Heintzmann, Peter; Koppers, Manfred; Bohnes, Karlheinz; and Smektala, Rolf-Peter, 4,586,530, Cl. 137-322.000.
Korber, Gunther: *See—*
Schondorfer, Georg; Fleischer, Johann; Stocker, Manfred; and Korber, Gunther, 4,586,823, Cl. 366-3.000.
Korf-BSW-Engineering GmbH: *See—*
Weber, Ralph; and Rothe, Herbert, 4,586,897, Cl. 432-121.000.
Kornfeld, Edmund C.: *See—*
Booher, Richard N.; and Kornfeld, Edmund C., 4,587,336, Cl. 544-105.000.
Korsgaard, Peter: *See—*
Friberg, Svend; Korsgaard, Peter; and Worsoe-Schmidt, Peder, 4,586,345, Cl. 62-235.100.
Kortec AG: *See—*
Weber, Ralph; and Rothe, Herbert, 4,586,897, Cl. 432-121.000.
Kosaka, Haruhisa; and Takaoka, Daizo, to Sanyo Electric Co., Ltd. Sunlight-into-energy conversion apparatus. 4,587,376, Cl. 136-248.000.
Kostelezky, Peter. Parachute. 4,586,685, Cl. 244-145.000.
Koster, William H., to E. R. Squibb & Sons, Inc. Desulfonation process for preparing 2-azetidinones. 4,587,051, Cl. 260-239.00A.
Kotani, Matahira: *See—*
Shirakoshi, Hiroshi; Matsumoto, Masafumi; Kawai, Ryoichi; and Kotani, Matahira, 4,587,418, Cl. 250-216.000.
Koterasawa, Matsuro, to National Semiconductor Corporation. IC class AB amplifier output stage. 4,587,491, Cl. 330-268.000.
Kouichi, Maeda; Masaaki, Funaki; Motoaki, Yoshida; and Yasuji, Ohtsuka, to Nippon Sheet Glass Co., Ltd. Method for producing light transmitting article of synthetic resin. 4,587,065, Cl. 264-1.500.
Kourtides, Demetrius A.: *See—*
Mikroyannidis, John A.; and Kourtides, Demetrius A., 4,587,324, Cl. 528-108.000.
Kouyama, Kazumi; Deguchi, Takashi; Kadono, Masahiro; and Harada, Shigeki, to Matsushita Electric Industrial Co., Ltd. Inverter-drive controlling apparatus. 4,587,605, Cl. 363-41.000.
Kozlow, Gary W., to Warner-Lambert Company. Safety slide clamp. 4,586,691, Cl. 251-7.000.
Kraemer, Rudolf E.; and Moritz, Werner, to AMP Incorporated. Connector assembly having camming system for mating and unmating. 4,586,771, Cl. 339-75.0MP.
Kraft, Inc.: *See—*
Bussell, Clifford J., 4,586,317, Cl. 53-451.000.
Kraftwerk Union Aktiengesellschaft: *See—*
Ulrych, Gerhard, 4,587,086, Cl. 376-399.000.
Kramer, Carl; and Dicks, Karl-Heinz. Equipment for curving glass sheets. 4,586,946, Cl. 65-273.000.
Kranefeld, Andreas; and Thannheiser, Axel, to Trutzschler GmbH & Co. KG. Grate for a fiber bale opener. 4,586,217, Cl. 19-80.00R.
Krausener, Gilbert: *See—*
Frou, Pascal; and Krausener, Gilbert, 4,586,356, Cl. 72-8.000.
Kraykovic, J. Alan: *See—*
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Kreitlow, Gerhard: *See—*
Anhauser, Dieter; Kreitlow, Gerhard; Olbrich, Hubertus; Reinhold, Karl-Heinz; Simon, Gunter; and Gockel, Karl-Heinz, 4,587,146, Cl. 428-41.000.
Kremer, Walter: *See—*
Bockemuhl-Simon, Johannes J.; Bernhardt, Rainer; and Kremer, Walter, 4,586,805, Cl. 354-323.000.
Kretschmar, Hans-Georg, to Cube-System Gerustbau GmbH. Construction-type support system. 4,586,302, Cl. 52-173.00R.
Kreutze, Gerhard: *See—*
Obstfelder, Gunther; Kreutze, Gerhard; and Luttig, Winfried, 4,587,411, Cl. 235-437.000.
Krishnakumar, C. K.: *See—*
Fields, Stephen F.; and Krishnakumar, C. K., 4,586,547, Cl. 141-35.000.
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Lind, Peter A., to Minnesota Mining and Manufacturing Company. Multiple intensity lamp controller and lighting system. 4,587,457, Cl. 315-64.000.
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Maglecic, Steven C. Method for packaging bulk materials composed of elongated pieces. 4,586,313, Cl. 53-437.000.
Magnetic Peripherals: *See—*
Berg, Thomas E.; and Pollard, Christopher A., 4,587,466, Cl. 318-38.000.
Magoon, Inder K., to General Electric Company. In-line annular piston fixed bolt regenerative variable charge liquid propellant gun with variable hydraulic control of piston. 4,586,422, Cl. 89-7.000.
Magyar, Karoly: *See—*
Budai, Zoltan; Benko, Pal; Ratz nee Simonek, Ildiko ; Rakoczy nee Pinter, Eva; Magyar, Karoly; Kelemen, Jozsef; and Mandi, Attila, 4,587,261, Cl. 514-542.000.
Maietti, Adriano; and Borgatelli, Carlo, to Vibac S.p.A. Printable release-coating compositions and printing ink for pressure-sensitive adhesive tape. 4,587,167, Cl. 428-352.000.
Main, Brian G.: *See—*
Brown, David; Dowell, Robert I.; Hargreaves, Rodney B.; and Main, Brian G., 4,587,246, Cl. 514-222.000.
Mainmet Limited: *See—*
Anderson, Alan F.; and Easterby, Robert W., 4,587,571, Cl. 360-2.000.
Mak, David W.; and Branson, Terry L., to Xerox Corporation. Media spindle clamp for disk drives utilizing removable recording media. 4,587,647, Cl. 369-270.000.
Maki, Tadashi: *See—*
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Makita, Fujio: *See—*
Yamakawa, Toru; Makita, Fujio; Umezawa, Mitsuo; and Sakakiyama, Ryuzo, 4,586,583, Cl. 180-247.000.
Makita, Muneharu; and Tanioku, Shozo, to Arakawa Kagaku Kogyo Kabushiki Kaisha. Method for producing improved water-absorbent resins. 4,587,308, Cl. 525-373.000.
Makiuchi, Hajime: *See—*
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Malaval, Claude, to Novatome. Slab for closing the vessel of a fast neutron nuclear reactor. 4,587,081, Cl. 376-287.000.
Malecki, George J. Methods and means of determining microorganism population. 4,587,213, Cl. 435-39.000.
Maleyko, John R. K.; and Grijak, Gerald. Extendible boot. 4,586,271, Cl. 36-1.500.
Maloney, David L.: *See—*
Liautaud, James P.; Stultz, Peter F.; and Maloney, David L., 4,587,593, Cl. 361-383.000.
Maloy, James E.: *See—*
Hagan, James A.; Maloy, James E.; and Wilke, Myron A. W., 4,587,139, Cl. 427-130.000.
Manahan, Antonio P. Therapeutic bed. 4,586,492, Cl. 128-33.000.
Manders, Steven D.: *See—*
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Mandi, Attila: *See*—
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Shapiro, Eugene; and Mandigo, Frank N., 4,586,967, Cl. 148-31.500.

Manfredi, Armando G., to RCA Corporation. Reusable centrifuge fixture and methods of making and using same. 4,586,375, Cl. 73-432.00R.

Manghisi, Elso; and Cascio, Giuseppe, to Instituto Lusofarmaco d'Italia S.p.A. Sulfonic resins having a therapeutical activity, preparation thereof and pharmaceutical compositions containing them. 4,587,242, Cl. 514-211.000.

Mangiapane, Philip. Method and apparatus for producing wound coils. 4,586,358, Cl. 72-142.000.

Mankins, William L.; Curtis, Lindy J.; and Stewart, Gene A., to Inco Alloys International, Inc. Canless method for hot working gas atomized powders. 4,587,096, Cl. 419-27.000.

Mannesmann Aktiengesellschaft: *See*—
Ungar, Karl-Heinz; and Cepin, Hermann, 4,587,659, Cl. 373-96.000.

Marathon LeTourneau Company: *See*—
Stoldt, Erwin F., 4,587,383, Cl. 191-12.00R.

Marchadour, Jean C. Solid product filling and measuring apparatus. 4,586,545, Cl. 141-1.000.

Marchbanks, Clandes. Caulk bead tool. 4,586,890, Cl. 425-458.000.

Marconi Avionics Limited: *See*—
Benjamin, Roy J.; Pearce, David W.; and Powell, Anthony W., 4,586,767, Cl. 339-45.00R.

Marek, Alois, to BBC Brown, Boveri & Company, Limited. Voltage limiting feed-through unit. 4,587,589, Cl. 361-56.000.

Marino, Joseph T., Jr.; and Chandos, Ronald V., to Motorola Inc. Processor for simulating digital structures. 4,587,625, Cl. 364-578.000.

Mark, David: *See*—
Vincent, James H.; Mark, David; Gibson, Harold; and Lynch, Gordon, 4,586,389, Cl. 73-863.220.

Markgraf, Wilhelm: *See*—
Lehmann, Werner; Fecker, Rainer; and Markgraf, Wilhelm, 4,586,704, Cl. 270-46.000.

Markisello, Frank. Method of disabling various types of lock cylinders in general motors motor vehicles. 4,586,233, Cl. 29-426.400.

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Heng, Jean-Paul; Marmonier, Andre ; and Briguet, Etienne, 4,586,843, Cl. 403-252.000.

Marnie, James P.: *See*—
Walter, Leo; Ring, Charles E.; Seppala, Bryan R.; Kennelly, Patric M.; and Marnie, James P., 4,586,778, Cl. 339-221.00R.

Marrone, Edward S.: *See*—
Nelson, Gary A.; Godding, Patrick N.; Schumaker, Richard E.; Walter, Keith D.; Marrone, Edward S.; Gates, Stillman F.; Rigsbee, Everett O., III; and Teener, Michael D., 4,587,651, Cl. 370-88.000.

Marsh, Richard L.; and Wetzel, Robert E., to Dayco Corporation. Method of making belt. 4,586,973, Cl. 156-140.000.

Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., to Borg-Warner Corporation. Mechanical seal. 4,586,719, Cl. 277-41.000.

Marsoner, Hermann; and Kroneis, Herbert, to AVL AG. Measuring device for determining the O_2 content of a sample. 4,587,101, Cl. 422-56.000.

Martens, John D.: *See*—
Ammon, J. Preston; Kendall, Jerry A.; and Martens, John D., 4,586,254, Cl. 29-884.000.

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Lindbeck, Michael J., 4,586,600, Cl. 198-499.000.

Martinray Industries Ltd.: *See*—
Labelle, H. M. Robert, 4,586,552, Cl. 160-133.000.

Martynova, Natalya I.: *See*—
Dubrovsky, Evgeny V.; Averkiev, Leonid A.; and Martynova, Natalya I., 4,586,563, Cl. 165-151.000.

Maruyama, Seiichi: *See*—
Nakano, Kouichi; Maruyama, Seiichi; Nakano, Seizo; and Sato, Masatomo, 4,587,592, Cl. 361-127.000.

Marvin, Dennis F.: *See*—
Keller, Anthony F.; and Marvin, Dennis F., 4,587,497, Cl. 331-116.00R.

Masaaki, Funaki: *See*—
Kouichi, Maeda; Masaaki, Funaki; Motoaki, Yoshida; and Yasuji, Ohtsuka, 4,587,065, Cl. 264-1.500.

Masaoka, Yoshiji; and Kubo, Motonobu, to Sanyo-Kokusaku Pulp Co., Ltd. Urethane (meth)acrylate compounds. 4,587,352, Cl. 549-335.000.

Mase, Katsuyoshi: *See*—
Murakami, Koichi; and Mase, Katsuyoshi, 4,587,438, Cl. 307-252.00C.

Massen, Robert. Method and arrangement for the continuous contactless measurement of the shrinkage of textiles. 4,586,372, Cl. 73-159.000.

Massender, Kenneth R. Tester for electric and pneumatic systems of vehicular trailers. 4,586,370, Cl. 73-121.000.

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Sargent, Ronald S.; and Morris, Bryan J., 4,586,724, Cl. 280-412.000.

Massey, James L.: *See*—
Omura, Jimmy K.; and Massey, James L., 4,587,627, Cl. 364-754.000.

Masuda, Kiyoshi, to Omron Tateisi Electronics Co. Card authenticating apparatus for card-based transaction processing system. 4,587,379, Cl. 179-2.0CA.

Masuda, Koji: *See*—
Sawamura, Keiichi; Eto, Yoshiyuki; Mine, Junichi; and Masuda, Koji, 4,587,231, Cl. 502-304.000.

Masuda, Nobuhito: *See*—
Nagatomo, Shigeru; Yasuda, Yukio; Masuda, Nobuhito; Makiuchi, Hajime; and Okazaki, Masaki, 4,587,102, Cl. 422-56.000.

Masuda, Toshimi: *See*—
Morishita, Masao; and Masuda, Toshimi, 4,586,342, Cl. 62-3.000.

Masumoto, Tsuyoshi; Inoue, Akihisa; and Tomioka, Hiroyuki, to Masumoto, Tsuyoshi; and Unitika Ltd. Iron-base alloy materials having excellent workability. 4,586,957, Cl. 75-124.000.

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Borase, Vijay; Smith, James F.; and Sagiv, Efraim, 4,587,068, Cl. 264-63.000.

Mathias Bauerle GmbH: *See*—
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Mathuni, Joseph: *See*—
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Matsubara, Tetsuyuki; Ito, Norifumi; Ichikawa, Kouzo; Arahari, Kouichi; and Maeda, Tetsuo, to Mitsui Toatsu Chemicals, Inc.; and Toyo Engineering Corporation. Continuous process for producing rubber modified high-impact resins. 4,587,294, Cl. 525-53.000.

Matsuda, Hideo, to Tokyo Shibaura Denki Kabushiki Kaisha. Press-packed semiconductor device with lateral fixing member. 4,587,550, Cl. 357-79.000.

Matsuda, Hiroshi: *See*—
Hirai, Yutaka; Tomida, Yoshinori; Matsuda, Hiroshi; and Nishimura, Yukuo, 4,586,980, Cl. 156-655.000.

Matsuda, Koichi; Tamaki, Shohei; Harada, Hiroshi; Nakashima, Masami; and Fujiyoshi, Makoto, to Denki Kagaku Kogyo Kabushiki Kaisha. Coating composition. 4,587,287, Cl. 524-404.000.

Matsui, Kazuma: *See*—
Watanabe, Kiyohiko; Hattori, Yoshiyuki; Matsui, Kazuma; Takei, Toshihiro; Nakamura, Toshiaki; and Ohnishi, Syunsaku, 4,586,877, Cl. 417-365.000.

Matsui, Tatsuhiko; Aida, Hiroyuki; Watanabe, Akira; and Oohazama, Tsuneyoshi, to Nissan Motor Company, Limited; and Kato Hatsujo Kaisha, Limited. Structure for removably mounting support rod for hood for motor vehicle. 4,586,579, Cl. 180-69.210.

Matsumoto, Masafumi: *See*—
Shirakoshi, Hiroshi; Matsumoto, Masafumi; Kawai, Ryoichi; and Kotani, Matahira, 4,587,418, Cl. 250-216.000.

Matsumoto, Toshio; and Kato, Motokazu, to Fujitsu Limited. System for processing machine check interruption. 4,587,654, Cl. 371-14.000.

Matsumura, Fukuo: *See*—
Itakura, Kazuharu; Matsumura, Fukuo; and Uejima, Hideyuki, 4,587,529, Cl. 346-76.0PH.

Matsumura, Susumu: *See*—
Suzuki, Takashi; Matsumura, Susumu; and Kitagishi, Nozomu, 4,586,786, Cl. 350-169.000.

Matsuno, Hiromitsu: *See*—
Ono, Tetsuo; Watanabe, Yoshio; Matsuno, Hiromitsu; Kato, Yasuo; Murayama, Seiichi; and Mikoshiba, Shigeo, 4,587,453, Cl. 313-25.000.

Matsuno, Mitsuo: *See*—
Yuasa, Hitoshi; Matsuno, Mitsuo; and Imai, Hirosuke, 4,587,057, Cl. 260-453.000.

Matsuo, Kenichi; and Nakata, Muneo, to Omron Tateisi Electronics Co. Electromagnetic relay. 4,587,502, Cl. 335-85.000.

Matsuoka, Mikiharu; Katayama, Hirohiko; and Horyu, Sakae, to Canon Kabushiki Kaisha. Conversation device with space and feed movement related to actuation time of control key. 4,587,663, Cl. 377-2.000.

Matsuoka, Yoshinori: *See*—
Watanabe, Masaki; Yagasaki, Akio; and Matsuoka, Yoshinori, 4,586,722, Cl. 280-103.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Kinoshita, Hiromi; Fujiwara, Kouji; and Maeda, Yoshinobu, 4,586,251, Cl. 29-741.000.
Kouyama, Kazumi; Deguchi, Takashi; Kadono, Masahiro; and Harada, Shigeki, 4,587,605, Cl. 363-41.000.
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Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Suzuki, Tadashi, 4,587,402, Cl. 219-343.000.
Ohno, Eiji; Kimura, Kunio; Yamada, Noboru; and Akahira, Nobuo, 4,587,209, Cl. 430-526.000.
Ueda, Shigeki, 4,587,393, Cl. 219-10.55B.
Yokotani, Yoichirou; Kato, Junichi; Nishida, Masamitsu; Ouchi, Hiromu; and Nitta, Tsuneharu, 4,586,972, Cl. 156-89.000.

Matsushita, Souichi: *See*—
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Matsuura, Kazuo: *See*—
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Yamaoka, Noboru; Kezuka, Seiju; Iida, Moriya; Miyoshi, Mituji; and Matsuura, Kazuo, 4,587,039, Cl. 252-511.000.

Matsuura, Sadaji; Arai, Yasuo; Aoki, Shigeki; and Ando, Satoru, to Fuji Fire-Proof Material Industry Co., Ltd. Process for producing a fire-resistant, light-weight construction board. 4,586,958, Cl. 106-15.050.

Matsuyama, Shigeru: *See—*
Umeda, Takao; Miyashita, Takao; Shimazaki, Yuzuru; Igawa, Tatsuo; Sasaki, Ken; and Matsuyama, Shigeru, 4,586,790, Cl. 350-337.000.

Maura, Biryoukoff: *See—*
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Maurer, Ghislain: *See—*
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Maxson, Myron T.; and Schoenherr, Christine J., to Dow Corning Corporation. Silicone water-based putty. 4,587,288, Cl. 524-425.000.

Mayambala-Mwanika, Christine; and White-Stevens, Rodric H., to Miles Laboratories, Inc. Ascorbate interference-resistant composition, device and method for the determination of peroxidatively active substances. 4,587,220, Cl. 436-66.000.

Mazda Motor Corporation: *See—*
Tokunaga, Toshimichi; and Kanai, Seita, 4,586,728, Cl. 280-707.000.

McAllister, Jack S. Curtain rod. 4,586,617, Cl. 211-105.200.

McAnelly, Jan A., to Block Business Forms, Inc. Method and apparatus for high-speed mounting of documents on zig-zag carrier. 4,586,703, Cl. 270-39.000.

McCarron, Michael: *See—*
Bala, John L.; McCarron, Michael; and Zapolin, Richard E., 4,587,590, Cl. 361-94.000.

McCartney, Charles P., Jr., to General Motors Corporation. Extruded compartmentalized container. 4,587,183, Cl. 429-176.000.

McCarty, William J., to General Electric Co. Intermediate temperature storage chamber. 4,586,347, Cl. 62-265.000.

McClelland, Scott R.: *See—*
Straton, Peter R.; and McClelland, Scott R., 4,587,630, Cl. 364-900.000.

McClure, Nathaniel D.: *See—*
Weaver, John R., II; and McClure, Nathaniel D., 4,586,243, Cl. 29-578.000.

McCoy, William L.: *See—*
Lee, Ronald A.; McCoy, William L.; and McQuinn, Ted M., 4,586,403, Cl. 74-866.000.

McCullough, Ross. Turbine. 4,587,435, Cl. 290-54.000.

McDonnell Douglas Corporation: *See—*
Gillette, Richard J., 4,587,669, Cl. 381-32.000.
Hall, Edward A., 4,587,524, Cl. 343-729.000.
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McDougall, Ian L.: *See—*
Brown, Ian J.; Bird, John M.; McDougall, Ian L.; and Black, David, 4,587,504, Cl. 335-216.000.

McGuire Company of San Francisco, The: *See—*
McGuire, John C., 4,586,751, Cl. 297-445.000.

McGuire, John C., to McGuire Company of San Francisco, The. Method of assembling rattan furniture. 4,586,751, Cl. 297-445.000.

McIntosh, Bruce M.: *See—*
Smith, Francis S.; McIntosh, Bruce M.; Hayman, Nigel W.; and Davidson, Scott, 4,586,708, Cl. 273-73.00D.

McKewan, Arthur J., to Microdot Inc. Convex wedge ramp thread configuration. 4,586,861, Cl. 411-311.000.

McNeely, Michael D., to Daniel Industries. Check valve mechanism. 4,586,534, Cl. 137-515.700.

McNeight, David L.; Lawrence, John G.; and Chorlton, Pauline. Competitive game. 4,586,707, Cl. 273-1.00R.

McNeilab, Inc.: *See—*
Ho, Chih Y., 4,587,244, Cl. 514-219.000.
Ho, Chih Y., 4,587,349, Cl. 548-491.000.

McPhail, Andrew T.: *See—*
Spielvogel, Bernard F.; McPhail, Andrew T.; and Hall, Iris H., 4,587,359, Cl. 564-8.000.

McPherson, Hugh, to Ferranti, PLC. Electrical circuit assemblies. 4,587,594, Cl. 361-383.000.

McQuinn, Ted M.: *See—*
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Mead Corporation, The: *See—*
Adair, Paul C.; Lee, Chuan; and Loel, Frank D., 4,587,194, Cl. 430-138.000.
Beaudet, William R., 4,587,528, Cl. 346-75.000.
DuVall, Dale R., 4,587,621, Cl. 364-577.000.

Megyeri, Gabor: *See—*
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.

Mehrotra, Yogesh: *See—*
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Meichsner, Walter: *See—*
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Meier, Hans: *See—*
Hubner, Erwin; and Meier, Hans, 4,586,829, Cl. 374-144.000.

Meinetsberger, Eike: *See—*
Klauser, Rainer; Meinetsberger, Eike; and Bichlmayer, Klaus, 4,587,250, Cl. 514-278.000.

Meissner, Konrad E.: *See—*
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Melmon, Kenneth L.: *See—*
Goodman, Murray; Castagnoli, Neal; Jacobson, Kenneth; Melmon, Kenneth L.; Rosenkranz, Roberto P.; and Verlander, Michael S., 4,587,046, Cl. 530-330.000.

Meloy, Gilbert K., to Twinoak Products, Inc. Process for producing color display means. 4,587,069, Cl. 264-102.000.

Melvin, Jeffrey R.: *See—*
Schlager, Kenneth J.; and Melvin, Jeffrey R., 4,586,514, Cl. 128-773.000.

Mena, Peter L., to Fiberglas Canada Inc. Polyester laminating compositions with improved interlaminar adhesion. 4,587,282, Cl. 523-508.000.

Menadue, William I.: *See—*
Morgan, Garth A.; Menadue, William I.; and Clarke, Robert E., 4,586,387, Cl. 73-862.050.

Mercier, Real L.: *See—*
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Merck & Co., Inc.: *See—*
Bhattacharya, Apurba, 4,587,357, Cl. 562-461.000.
Halczenko, Wasyl; and Hartman, George D., 4,587,253, Cl. 514-289.000.
Harris, Elbert E.; Thorsett, Eugene D.; and Patchett, Arthur A., 4,587,050, Cl. 260-239.30R.
Harris, Elbert E.; Patchett, Arthur A.; and Thorsett, Eugene D., 4,587,238, Cl. 514-183.000.
Linn, Bruce O.; and Mrozik, Helmut H., 4,587,247, Cl. 514-222.000.

Meridian Petroleums Ltd.: *See—*
Berkowitz, Norbert, 4,586,935, Cl. 44-1.00R.

Merijanian, Aspet V.: *See—*
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Messer Griesheim GmbH: *See—*
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Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung: *See—*
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Messier-Hispano-Bugatti: *See—*
Veaux, Jacques; and Derrien, Michel, 4,586,682, Cl. 244-102.00R.

Metal Box p.l.c.: *See—*
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,587,075, Cl. 264-573.000.

Metzeler Kautschuk GmbH: *See—*
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Meunier, Gilles: *See—*
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Meyborg, Holger: *See—*
Kopp, Richard; Meyborg, Holger; Grogler, Gerhard; and Schwindt, Jurgen, 4,587,275, Cl. 521-163.000.

Meyers, Charles J. Emergency exit light or the like. 4,587,597, Cl. 362-20.000.

Meyn, Pieter. Apparatus for removing the breast from the eviscerated carcass of chickens or the like. 4,586,215, Cl. 17-11.000.

Mezei, Louis M.; Reeves, Richard W.; Leath, Richard A.; and Widunas, Joseph T., to Cetus Corporation. Liquid handling device and method. 4,586,546, Cl. 141-2.000.

Michaelis, Theodore D.: *See—*
Bendell, Sidney L.; and Michaelis, Theodore D., 4,587,563, Cl. 358-213.000.

Michaely, William J.; and Curtis, Jeff K., to Stauffer Chemical Co. Arylacryl aliphatic amide herbicidal compounds and methods of use. 4,586,954, Cl. 71-94.000.

Michalske, Terry A.: *See—*
Keefer, Keith D.; and Michalske, Terry A., 4,587,224, Cl. 501-4.000.

Michiguchi, Yoshihiro: *See—*
Izumi, Shigeru; Michiguchi, Yoshihiro; and Senoh, Makoto, 4,586,378, Cl. 73-572.000.

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Isobe, Mitsuo; Sakurai, Takayasu; Sawada, Kazuhiro; Iizuka, Tetsuya; Ohtani, Takayuki; and Aono, Akira, 4,587,638, Cl. 365-200.000.

Microdot Inc.: *See—*
Eckenrode, Paul D.; and Eisenbrei, Richard P., 4,586,556, Cl. 164-342.000.
McKewan, Arthur J., 4,586,861, Cl. 411-311.000.

Middlekauff, Carle A., to Parker-Hannifin Corporation. Compact high torque hydraulic motors. 4,586,885, Cl. 418-61.00B.

Mikhailov, Vasily S.: *See—*
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Miki, Kazuyoshi: *See—*
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Miki, Kosuke; and Hiruta, Shiro, to Asahi Kasei Kogyo Kabushiki Kaisha. Electronic delay detonator. 4,586,437, Cl. 102-220.000.

Mikoshiba, Shigeo: *See—*
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Mikroyannidis, John A.; and Kourtides, Demetrius A., to United States of America, Administrator, National Aeronautics and Space Administration. Polymer of phosphonylmethyl-2,4-and -2,6-diamino benzene and polyfunctional monomer. 4,587,324, Cl. 528-108.000.

Milberger, Lionel J. Method and apparatus for measuring driving resistance and velocity of piles during driving. 4,586,366, Cl. 73-12.000.
Miles Laboratories, Inc.: *See*—
Barnes, Bruce E.; Dupin, William W.; and Kuhlemann, Bruce W., 4,586,928, Cl. 604-408.000.
Collins, Michael S.; and Roby, Robert E., 4,587,121, Cl. 424-87.000.
Mayambala-Mwanika, Christine; and White-Stevens, Rodric H., 4,587,220, Cl. 436-66.000.
Miller, Charlie D. Continuous tube extractor. 4,586,695, Cl. 254-30.000.
Miller, Heidi M.: *See*—
Oakley, Peter J.; Stockham, Norman R.; and Miller, Heidi M., 4,587,395, Cl. 219-121.0LD.
Miller, John H., to Eastman Kodak Company. Dual transducer assembly with linear adjustment. 4,587,587, Cl. 360-109.000.
Miller, Kenneth F., to General Electric Company. Composition comprising a copolyester-carbonate and a polymeric impact modifier. 4,587,298, Cl. 525-67.000.
Miller, Leroy J.: *See*—
Brault, Robert G.; and Miller, Leroy J., 4,587,203, Cl. 430-325.000.
Miller, Paul S.; and Ts'O, Paul O. P., to Johns Hopkins University, The. Linkage of proteins to nucleic acids. 4,587,044, Cl. 530-211.000.
Miller, William H.; and Neumann, Thomas E., to Monsanto Company. Oxidative ring cleavage process. 4,587,061, Cl. 260-502.50F.
Milnes, Arthur G. Capacitive card and reader parking system. 4,587,410, Cl. 235-382.000.
Minakuchi, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Binary counter having buffer and coincidence circuits for the switched bistable stages thereof. 4,587,665, Cl. 377-116.000.
Minami, Satoyuki; Tanaka, Kazuhiro; and Nishioka, Takeshi, to Toray Industries, Inc. Production of polyethylene terephthalate film for magnetic recording. 4,587,071, Cl. 264-210.700.
Minami, Setsuo: *See*—
Tokuhara, Mitsuhiro; and Minami, Setsuo, 4,586,814, Cl. 355-55.000.
Minami, Shinichi: *See*—
Yatsuda, Yuji; Hagiwara, Takaaki; Kondo, Ryuji; Minami, Shinichi; and Itoh, Yokichi, 4,586,238, Cl. 29-571.000.
Minden, Carl S., to Breckinridge Minerals, Inc. Process for recovering shale oil from raw oil shale. 4,587,006, Cl. 208-410.000.
Minderhoud, Johannes K.; Post, Martin F. M.; Sie, Swan T.; and Sudholter, Ernst J. R., to Shell Oil Company. Process comprising reforming, synthesis, and hydrocracking. 4,587,008, Cl. 208-109.000.
Mine, Junichi: *See*—
Sawamura, Keiichi; Eto, Yoshiyuki; Mine, Junichi; and Masuda, Koji, 4,587,231, Cl. 502-304.000.
Minigrip, Inc.: *See*—
Ausnit, Steven, 4,586,319, Cl. 53-468.000.
MiniScribe Corporation: *See*—
Wong, Walter; Abrams, Robert; Nagl, Alan; and Repphun, William, 4,587,645, Cl. 369-75.100.
Ministry of International Trade & Industry: *See*—
Katsumata, Tooru; Terashima, Kazutaka; Nakajima, Hiroaki; and Fukuda, Tsuguo, 4,586,979, Cl. 156-601.000.
Minnesota Mining and Manufacturing Company: *See*—
Campbell, Douglas D.; and Donovan, Mary B., 4,587,148, Cl. 428-88.000.
Fisch, Richard S., 4,587,198, Cl. 430-201.000.
Ishida, Takuzo; and Weigel, David C., 4,587,211, Cl. 430-619.000.
Kistner, John F., 4,587,169, Cl. 428-413.000.
Lind, Peter A., 4,587,457, Cl. 315-64.000.
Loder, Harry A., 4,586,629, Cl. 221-46.000.
Loder, Harry A., 4,586,630, Cl. 221-46.000.
Loder, Harry A., 4,586,631, Cl. 221-58.000.
Voll, Gerhard W.; and Weiher, Richard L., 4,586,489, Cl. 126-438.000.
Wu, Maan-shii S., 4,587,156, Cl. 428-207.000.
Minolta Camera Kabushiki Kaisha: *See*—
Hamaguri, Kenji, 4,586,513, Cl. 128-633.000.
Tominaga, Shinji; Nakai, Masaaki; Inoue, Norihiro; Fujino, Akihiko; Inoue, Manabu; and Taniguchi, Nobuyuki, 4,586,800, Cl. 354-21.000.
Minter, Mark A.; and Driskell, William L., to Puritan-Bennett Corporation. Valve actuating latching coupler for high pressure device. 4,586,634, Cl. 222-3.000.
Mission Research Corporation: *See*—
Adler, Richard J., 4,587,430, Cl. 250-423.00R.
Misterka, Walter M.: *See*—
Cooper, Rosemary J.; Misterka, Walter M.; and Mercier, Real L., 4,586,616, Cl. 211-87.000.
Mital, Mark D.: *See*—
Sawicki, Frank S.; Mital, Mark D.; and Osborne, Francis J., 4,586,945, Cl. 65-138.000.
Mitchell, Dennis R.: *See*—
Paulsen, David C.; Calvert, William L.; Mitchell, Dennis R.; and Graveille, Larry D., 4,586,763, Cl. 339-6.00R.
Mitogawa, Fukumatsu: *See*—
Takai, Takao; Okada, Fumio; Odawara, Hiroyoshi; and Mitogawa, Fukumatsu, 4,586,320, Cl. 53-512.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Akasu, Masahira, 4,586,474, Cl. 123-425.000.
Asayama, Yoshiaki; and Kominami, Seiya, 4,586,476, Cl. 123-440.000.
Hasegawa, Masakoto, 4,587,482, Cl. 324-78.00D.
Igarashi, Yoshinobu; and Nakamura, Takashi, 4,586,351, Cl. 62-468.000.
Inao, Hiroshi; and Nishida, Mitsuhiro, 4,586,880, Cl. 417-424.000.
Nakamura, Shunichi; and Dohi, Hiroyuki, 4,587,569, Cl. 358-296.000.
Ohishi, Kenji, 4,586,349, Cl. 62-296.000.
Takahashi, Akira; Danno, Yoshiaki; Iida, Kazumasa; and Iwata, Toshio, 4,586,475, Cl. 123-425.000.
Tomoda, Toshimasa; Fukakusa, Shinji; and Yamashita, Shinichi, 4,587,429, Cl. 250-375.000.
Yamawaki, Masahiko, 4,587,470, Cl. 318-564.000.
Mitsubishi Jidosha Kogyo Kaisha: *See*—
Takahashi, Akira; Danno, Yoshiaki; Iida, Kazumasa; and Iwata, Toshio, 4,586,475, Cl. 123-425.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Okamoto, Toshiro; and Ohshima, Michio, 4,587,011, Cl. 208-129.000.
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kitaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,095, Cl. 419-13.000.
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,174, Cl. 428-552.000.
Mitsubishi Paper Mills, Ltd.: *See*—
Miyauchi, Masahiro; and Higuchi, Masahiro, 4,587,537, Cl. 346-208.000.
Mitsui Toatsu Chemicals, Inc.: *See*—
Matsubara, Tetsuyuki; Ito, Norifumi; Ichikawa, Kouzo; Arahari, Kouichi; and Maeda, Tetsuo, 4,587,294, Cl. 525-53.000.
Miyagi, Morio; Ohno, Makoto; and Kanaizumi, Masaru, to Toyo Boseki Kabushiki Kaisha. Hollow fiber membrane for dialysis. 4,587,168, Cl. 428-369.000.
Miyake, Haruhisa; Ito, Hiroaki; Suzuki, Koji; and Yamada, Ryoji, to Asahi Glass Company, Ltd. Process for producing potassium hydroxide. 4,586,992, Cl. 204-98.000.
Miyake, Hideo: *See*—
Shinohara, Kazuhiro; Abe, Shunzo; and Miyake, Hideo, 4,586,996, Cl. 522-7.000.
Miyamoto, Manabu: *See*—
Mori, Takasuke; Miyazaki, Jun; Miyamoto, Manabu; and Narita, Kiichi, 4,586,558, Cl. 164-440.000.
Miyashita, Takaaki: *See*—
Kubo, Keishi; Miyashita, Takaaki; and Yasumori, Akiyoshi, 4,586,811, Cl. 355-14.00R.
Miyashita, Takao: *See*—
Umeda, Takao; Miyashita, Takao; Shimazaki, Yuzuru; Igawa, Tatsuo; Sasaki, Ken; and Matsuyama, Shigeru, 4,586,790, Cl. 350-337.000.
Miyashita, Tsune: *See*—
Murayama, Seiichi; Yasuda, Makoto; Miyashita, Tsune; Arai, Yoji; Kawasumi, Kenichi; and Kinoshita, Kazunori, 4,587,460, Cl. 315-174.000.
Miyauchi, Masahiro; and Higuchi, Masahiro, to Mitsubishi Paper Mills, Ltd. Heat-sensitive recording sheet. 4,587,537, Cl. 346-208.000.
Miyauchi, Yoshio; Takenaka, Kiyosi; and Bessho, Yoshihiko, to Dainippon Screen Mfg. Co., Ltd. Liquid developing equipment for electrophotographic copying machine. 4,586,809, Cl. 355-10.000.
Miyayama, Takashi, to Toyo Communication Equipment Co., Ltd. Temperature compensating circuit for oscillator. 4,587,499, Cl. 331-176.000.
Miyazaki, Hiroshi: *See*—
Arika, Junji; Aimoto, Michiyuki; and Miyazaki, Hiroshi, 4,587,115, Cl. 423-329.000.
Miyazaki, Hitoshi: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, 4,587,098, Cl. 422-7.000.
Miyazaki, Jun: *See*—
Mori, Takasuke; Miyazaki, Jun; Miyamoto, Manabu; and Narita, Kiichi, 4,586,558, Cl. 164-440.000.
Miyazaki, Shu, to Sumitomo Metal Mining Co., Ltd. Photomask for use in making a carrier tape. 4,587,185, Cl. 430-5.000.
Miyoshi, Mituji: *See*—
Inoue, Takashi; Miyoshi, Mituji; Matsuura, Kazuo; and Yamamoto, Kaoru, 4,587,318, Cl. 526-282.000.
Yamaoka, Noboru; Kezuka, Seiju; Iida, Moriya; Miyoshi, Mituji; and Matsuura, Kazuo, 4,587,039, Cl. 252-511.000.
Mizuma, Kaoru, to Tokyo Rope Mfg. Co., Ltd. Metal cord for reinforcing rubber products. 4,586,324, Cl. 57-212.000.
Mizuno, Ryukichi: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, 4,587,098, Cl. 422-7.000.
Mizushima, Yoshihiko: *See*—
Amemiya, Yoshihito; Sugeta, Takayuki; and Mizushima, Yoshihiko, 4,587,547, Cl. 357-59.000.
MNR Reprossesing, Inc.: *See*—
Potter, George M.; Bergmann, Arthur; and Haidlen, Ulrich, 4,587,110, Cl. 423-30.000.
Moatti, Jean-Claude: *See*—
Christophe, Theophile; and Moatti, Jean-Claude, 4,587,017, Cl. 210-323.100.
Mobi-Jack Inc.: *See*—
Kvamme, Rolf, 4,586,866, Cl. 414-563.000.

Mobil Oil Corporation: *See—*
Horodysky, Andrew G.; and Kaminski, Joan M., 4,587,025, Cl. 252-34.000.
Horodysky, Andrew G., 4,587,026, Cl. 252-47.500.
Hsia, Chung H., 4,587,373, Cl. 585-639.000.
Krutchen, Charles M.; and Wu, Wen-Pao, 4,587,271, Cl. 521-60.000.
Rogers, Thomas A., 4,587,032, Cl. 252-174.170.
Rudnick, Leslie R., 4,587,007, Cl. 208-107.000.

Mochida, Takaaki; and Yamashita, Junichi, to Hitachi, Ltd. Fuel assembly for boiling water reactor. 4,587,090, Cl. 376-428.000.

Mochizuki, Yasuyoshi: *See—*
Hoshino, Fumio; and Mochizuki, Yasuyoshi, 4,586,815, Cl. 355-76.000.

Mocquart, Jacques M.; and Dang, Alain Y., to Societe des Transport Petroliers par Pipe-Line. Ball launcher for standard tube for monitoring a volume meter. 4,586,529, Cl. 137-268.000.

Moeckel, Mark D.: *See—*
Barrett, John R.; Cemenska, Richard A.; Gladden, John R.; Moeckel, Mark D.; and Schneider, Philip H., 4,586,338, Cl. 60-618.000.

Molbert, John L.: *See—*
Regimand, Ali; and Molbert, John L., 4,587,623, Cl. 364-571.000.

Moli Energy Limited: *See—*
Stiles, James A. R.; Brandt, Klaus; Wainwright, David S.; and Lee, Keith C., 4,587,182, Cl. 429-94.000.

Molnlycke AB: *See—*
Birring, Mats G., 4,586,199, Cl. 2-401.000.

Molteno, Anthony C. B. Testing to determine the fixation and focusing of living eyes. 4,586,796, Cl. 351-206.000.

Monen, Marinus J. B. M.; Furukawa, Shunsuke; and Furuya, Tsuneo, to Sony Corporation. Disc playback apparatus. 4,587,643, Cl. 369-32.000.

Monge, William A.; and Cerra, Joseph M., to Nestec S.A. Filling method and apparatus. 4,586,314, Cl. 53-444.000.

Moniotte, Philippe G., to Monsanto Europe, S.A. Organic thiosulphates and thiosulphonates useful as stabilizing agents for rubber vulcanisates. 4,587,296, Cl. 525-61.000.

Monsanto Company: *See—*
Dyroff, David R.; and Chou, Yueting, 4,587,033, Cl. 524-405.000.
Garner, Albert Y.; Gabbert, James D.; and Hedrick, Ross M., 4,587,305, Cl. 525-331.900.
Howe, Robert K.; and Lee, Len F., 4,586,948, Cl. 71-90.000.
Miller, William H.; and Neumann, Thomas E., 4,587,061, Cl. 260-502.50F.

Monsanto Europe, S.A.: *See—*
Moniotte, Philippe G., 4,587,296, Cl. 525-61.000.

Montepolimeri S.p.A.: *See—*
Cavaterra, Enrico; and Bossi, Alessandro, 4,587,230, Cl. 502-225.000.

Mooney, Paul C.; and Koch, Theodore F., to Quick-Set Incorporated. Minimum fit worm and gear drive. 4,586,393, Cl. 74-396.000.

Moore, Cecil A., to Koala Technologies Corporation. Two-layer touch tablet. 4,587,378, Cl. 178-18.000.

Moore, Michael L.: *See—*
Huffman, William F.; and Moore, Michael L., 4,587,045, Cl. 530-328.000.

Moradi-Araghi, Ahmad; and Shaw, James E., to Phillips Petroleum Company. Polymerflood process. 4,586,568, Cl. 166-273.000.

Morard, Michel; and Baseggio, Marcello, to Atelier de Construction Steiger S.A. Rectilinear knitting machine. 4,586,352, Cl. 66-64.00R.

Morelli, Robert J.: *See—*
Dapra, David J.; Clementi, John B.; and Morelli, Robert J., 4,586,497, Cl. 128-92.00E.

Morgan Construction Company: *See—*
Simmons, Thomas E.; Divirgilio, Ralph F.; and Innis, Charles L., Jr., 4,586,720, Cl. 277-152.000.

Morgan, Garth A.; Menadue, William I.; and Clarke, Robert E., to Commonwealth of Australia, The. Flight test aid. 4,586,387, Cl. 73-862.050.

Mori, Atsushi: *See—*
Morikawa, Takao; Kobayasi, Tosio; Kataoka, Masayuki; and Mori, Atsushi, 4,587,201, Cl. 430-284.000.

Mori, Kozo, to International Harvest Co., Ltd. Surfboard protector. 4,586,451, Cl. 114-219.000.

Mori, Mituyoshi, to Kabushiki Kaisha Daikin Seisakusho. Power change-over mechanism of a vehicle for industrial machinery. 4,586,592, Cl. 192-49.000.

Mori, Shigeki, to Murata Kikai Kabushiki Kaisha. Bobbin conveying system. 4,586,668, Cl. 242-35.50A.

Mori, Takasuke; Miyazaki, Jun; Miyamoto, Manabu; and Narita, Kiichi, to Kabushiki Kaisha Kobe Seiko Sho. Structure of feed nozzle unit for horizontal continuous casting process. 4,586,558, Cl. 164-440.000.

Moriconi, Emil: *See—*
Doswald, Paul; Moriconi, Emil; Moser, Helmut; and Schmid, Horst, 4,587,292, Cl. 534-606.000.

Morigaki, Masakazu: *See—*
Ono, Michio; Morigaki, Masakazu; Kamio, Takayoshi; Aoki, Kozo; and Furuya, Kazuhiko, 4,587,210, Cl. 430-555.000.

Morikawa, Takao; Kobayasi, Tosio; Kataoka, Masayuki; and Mori, Atsushi, to Nippon Soda Co. Ltd. Photo-curable urethane-acrylate resin composition for permanent resist. 4,587,201, Cl. 430-284.000.

Morimoto, Kenji; Ikegami, Tamotsu; Naito, Masao; Kubo, Tateo; and Kizawa, Shinichi, to Toyo Seikan Kaisha, Ltd. Apparatus for shaping an metallic pull ring and simultaneously connecting it to a container closure. 4,586,863, Cl. 413-14.000.

Morimoto, Satoshi: *See—*
Kagitani, Yoshio; Ueda, Yasuo; Munechika, Kozi; Morimoto, Satoshi; Komeda, Shirou; Tanaka, Kenji; and Yokoyama, Kazumasa, 4,587,122, Cl. 424-101.000.
Ueda, Yasuo; Shiraga, Yusei; Morimoto, Satoshi; Kagitani, Yoshio; Funakoshi, Satoshi; and Suyama, Tadakazu, 4,587,052, Cl. 260-239.30T.

Morin, John M., Jr.: *See—*
Cooper, Robin D. G.; Morin, John M., Jr.; and Peters, Lynn R., 4,587,053, Cl. 260-245.400.

Morishima, Norihisa: *See—*
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Shiokawa, Kozo; Morishima, Norihisa; and Goto, Toshio, 4,586,951, Cl. 71-92.000.

Morishita, Masao; and Masuda, Toshimi, to Nissin Electric Co., Ltd. Dehumidifying and cooling apparatus. 4,586,342, Cl. 62-3.000.

Morita, Arihiko: *See—*
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.

Moritz, Werner: *See—*
Kraemer, Rudolf E.; and Moritz, Werner, 4,586,771, Cl. 339-75.0MP.

Morley Furniture Spring Corporation: *See—*
Crosby, Lawton H., 4,586,700, Cl. 267-105.000.

Morner, Bengt L.: *See—*
Andersson, Olle; and Morner, Bengt L., 4,586,472, Cl. 123-401.000.

Morris, Bryan J.: *See—*
Sargent, Ronald S.; and Morris, Bryan J., 4,586,724, Cl. 280-412.000.

Morris, Henrietta K., to Surgikos, Inc. Surgical drape with arm board cover. 4,586,498, Cl. 128-132.00D.

Morris, Norman, to Leslie Hartridge Limited. Means for use in connecting a drive coupling to a non-splined end of a pump drive member. 4,586,845, Cl. 403-354.000.

Morris, William W., to X-Cel X-Ray Corporation. X ray unit for podiatry. 4,587,668, Cl. 378-197.000.

Morten, John. Lighting fixture. 4,587,600, Cl. 362-219.000.

Mortenson, Leonard E.: *See—*
Patel, Ramesh N.; and Mortenson, Leonard E., 4,587,216, Cl. 435-123.000.

Moser, Helmut: *See—*
Doswald, Paul; Moriconi, Emil; Moser, Helmut; and Schmid, Horst, 4,587,292, Cl. 534-606.000.

Moss, Brian F.; Pilkington, Ian B.; and Brent, Richard J., to Ciba-Geigy AG. Developing drum. 4,586,803, Cl. 354-313.000.

Mossbach, Wilhelm, to Philipp Kreis GmbH & Co. Truma-Geratebau. Space heater for small compartments. 4,586,484, Cl. 126-91.00R.

Motoaki, Yoshida: *See—*
Kouichi, Maeda; Masaaki, Funaki; Motoaki, Yoshida; and Yasuji, Ohtsuka, 4,587,065, Cl. 264-1.500.

Motoren-und Turbinen-Union Munchen GmbH: *See—*
Hagemeister, Klaus, 4,586,564, Cl. 165-159.000.

Motorola, Inc.: *See—*
Gray, Randall C.; and Joseph, Eric D., 4,587,442, Cl. 307-350.000.
Keller, Anthony F.; and Marvin, Dennis F., 4,587,497, Cl. 331-116.00R.
Marino, Joseph T., Jr.; and Chandos, Ronald V., 4,587,625, Cl. 364-578.000.
Mullen, William B., III; Van Hout, James E.; and Bradford, William M., 4,586,764, Cl. 339-17.00M.
Shupe, Chester D., 4,587,523, Cl. 343-7.300.

Motte, Jean-Pierre; and Maurer, Ghislain, to Institut de Recherches de la Siderurgie Francaise; and Clecim SA. Direct-current metallurgical arc furnace and method of melting with same. 4,587,660, Cl. 373-108.000.

Moulin, Blaise, to Caracteres S.A. Characters carrying disc for printing machine. 4,586,836, Cl. 400-144.200.

Mozume, Teruo: *See—*
Tosaki, Hiromi; Mozume, Teruo; Arima, Hideo; and Ikegami, Akira, 4,587,040, Cl. 252-519.000.

Mrozik, Helmut H.: *See—*
Linn, Bruce O.; and Mrozik, Helmut H., 4,587,247, Cl. 514-222.000.

MSI Electronics Inc.: *See—*
Shulman, Carl, 4,587,484, Cl. 324-158.00F.

Mudge, Ronald K.: *See—*
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.

Mueller, Dieter J., to Huels Aktiengesellschaft. Process for the production of dichloroisobutenes. 4,587,367, Cl. 570-216.000.

Mueller, John L. Rotation brush mechanism with speed control governor. 4,586,210, Cl. 15-29.000.

Muerdter, Herbert; Hermann, Bernhard; and Pfister, Johann, to August Sauter GmbH. Measuring apparatus with automatic operating mode-setting. 4,586,575, Cl. 177-124.000.

Mues, Gabriele: *See—*
Barchas, Jack D.; Weber, Eckard; Evans, Christopher J.; Wei, E. T.; Chang, J. K.; Fuchs, Ingbert; and Mues, Gabriele, 4,587,233, Cl. 514-15.000.

Mues, Peter: *See—*
Buysch, Hans-Josef; Klipper, Reinhold; Lange, Peter M.; and Mues, Peter, 4,587,347, Cl. 548-317.000.

Mugford, Lawrence W.; and Bresnahan, John T., to Chrysler Corporation. Vehicle lifting jack with integral stowable crank handle. 4,586,696, Cl. 254-122.000.
Multidrive Limited: *See—*
Brown, David P.; and Brown, John B., 4,586,578, Cl. 180-14.400.
Mullen, William B., III; Van Hout, James E.; and Bradford, William M., to Motorola, Inc. Electrical subassembly structure. 4,586,764, Cl. 339-17.00M.
Muller, Alexander, to General Electric Company. Method and apparatus for assembling a rotatable machine and a method for operating the apparatus. 4,586,244, Cl. 29-598.000.
Muller-Erwig, Horst; and Brand, Wilhelm, to Hermann Berstorff Maschinenbau GmbH. Apparatus for producing open-sided V-belts. 4,586,410, Cl. 83-175.000.
Muller, Johannes C. A.; and Schout, Arnoldus R. C., to U.S. Philips Corporation. Device for measuring the single flank error of a pair of intermeshing toothed wheels. 4,586,373, Cl. 73-162.000.
Muller, Wolfgang; Knuttel, Bertold; and Laukien, Gunther, to Bruker Analytische Messtechnik GmbH. Electromagnet for NMR tomography. 4,587,490, Cl. 324-320.000.
Mullin, Edward L. Building construction. 4,586,300, Cl. 52-93.000.
Munechika, Kozi: *See—*
Kagitani, Yoshio; Ueda, Yasuo; Munechika, Kozi; Morimoto, Satoshi; Komeda, Shirou; Tanaka, Kenji; and Yokoyama, Kazumasa, 4,587,122, Cl. 424-101.000.
Munetsugu, Eiichi; and Ushiki, Hiroshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Input device. 4,587,519, Cl. 340-711.000.
Munier, Bernard; and Arques, Marc, to Thomson-CSF. Photosensitive device for infrared radiation. 4,587,426, Cl. 250-338.000.
Munro, Robert: *See—*
Allen, Gordon L.; Munro, Robert; and Day, Roger A., 4,586,553, Cl. 164-30.000.
Munsch, Klaus: *See—*
Ehlscheid, Gunter; and Munsch, Klaus, 4,586,598, Cl. 198-356.000.
Munstedt, Helmut; Gebhard, Helmut; Naarmann, Herbert; and Schlag, Johannes, to BASF Aktiengesellschaft. Pyrrole polymers as electrical heating elements. 4,587,037, Cl. 252-500.000.
Murachi, Tatsuya, to Toyoda Gosei Co., Ltd. Electrostatic flocking products with polyurethane adhesive. 4,587,149, Cl. 428-90.000.
Muraguchi, Yutaka; Yoshida, Katsusuke; and Shiraishi, Shoichi, to Hoko Sangyo Co., Ltd. Support device for checking and repairing a heavy rotatable object. 4,586,864, Cl. 414-433.000.
Murai, Toshiaki; Kawana, Takeshi; and Asano, Toshio, to Hitachi, Ltd. Apparatus for inserting electronic elements. 4,586,247, Cl. 29-705.000.
Murakami, Katsushi, to Kabushiki Kaisha Bandai. Transformable toy vehicle. 4,586,911, Cl. 446-376.000.
Murakami, Koichi; and Mase, Katsuyoshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Turn-off circuit for gate turn-off thyristor. 4,587,438, Cl. 307-252.00C.
Murata, Hiroshi: *See—*
Sasaki, Yutaka; Nakamura, Toshio; Yamamoto, Hiroshi; Murata, Hiroshi; Nakamura, Yoshimi; and Takahashi, Naohiro, 4,587,226, Cl. 502-5.000.
Murata Kikai Kabushiki Kaisha: *See—*
Mori, Shigeki, 4,586,668, Cl. 242-35.50A.
Murayama, Seiichi; Yasuda, Makoto; Miyashita, Tsune; Arai, Yoji; Kawasumi, Kenichi; and Kinoshita, Kazunori, to Hitachi, Ltd. High-pressure discharge lamp operating circuit. 4,587,460, Cl. 315-174.000.
Murayama, Seiichi: *See—*
Ono, Tetsuo; Watanabe, Yoshio; Matsuno, Hiromitsu; Kato, Yasuo; Murayama, Seiichi; and Mikoshiba, Shigeo, 4,587,453, Cl. 313-25.000.
Murray, Alexander P.; Weisberg, Sharon L.; and Becker, Lawrence F., Jr., to Westinghouse Electric Corp. Decontamination of metal surfaces in nuclear power reactors. 4,587,043, Cl. 252-626.000.
Muti, Elliott J. Flashlight holder. 4,586,741, Cl. 294-19.100.
Myers, Thomas A.; and Barnes, Robert P., to Myers, Thomas A. Well drilling apparatus. 4,586,572, Cl. 175-85.000.
N. J. McAllister Petroleum Industries, Inc.: *See—*
Reardon, Daniel R., 4,586,526, Cl. 137-70.000.
Naarmann, Herbert: *See—*
Munstedt, Helmut; Gebhard, Helmut; Naarmann, Herbert; and Schlag, Johannes, 4,587,037, Cl. 252-500.000.
Nabinger, Herman G. Steering device for a wheelchair. 4,586,723, Cl. 280-242.0WC.
Nagahori, Yukihiro: *See—*
Hara, Kenji; Nagahori, Yukihiro; Watanabe, Tsugio; Itoh, Akio; and Izumi, Hikoshi, 4,586,838, Cl. 400-320.000.
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, to Hitachi, Ltd. Resin composition and laminate produced therefrom comprising a cyclized polybutadiene and a prepolymer of a isocyanuric or cyanuric acid derivative. 4,587,162, Cl. 428-290.000.
Nagamathu, Toshihiro: *See—*
Kato, Yoshio; Nagamathu, Toshihiro; Tsurumi, Kazufumi; Nakayama, Shozo; and Kato, Kimio, 4,586,876, Cl. 417-269.000.
Nagano, Akihiko; and Iizuka, Kiyoshi, to Canon Kabushiki Kaisha. Camera capable of special effects photography. 4,586,802, Cl. 354-219.000.
Nagano, Masashi, to Shimano Industrial Company Limited. Speed change operating device for a bicycle. 4,586,396, Cl. 74-473.00R.
Nagano, Masashi, to Shimano Industrial Company Limited. Front derailleur for a bicycle. 4,586,913, Cl. 474-80.000.
Nagano, Masashi, to Shimano Industrial Company Limited. Multistage front chain gear for a bicycle. 4,586,914, Cl. 474-160.000.
Nagaraj, D. R.; and Wang, Samuel S., to American Cyanamid Company. Monothiophosphinates as acid, neutral, or mildly alkaline circuit sulfide collectors and process for using same. 4,587,013, Cl. 209-167.000.
Nagasawa, Hiroshi: *See—*
Toyofuku, Hatsunori; Tsuriya, Yoshihiro; Kuroda, Toshio; Aoki, Hitoshi; and Nagasawa, Hiroshi, 4,587,254, Cl. 514-326.000.
Nagashima, Akira; and Taomo, Toshio, to Kioritz Corporation. Chain saw safety-brake system. 4,586,588, Cl. 188-77.00R.
Nagashima, Masayoshi: *See—*
Hachisuga, Takaaki; Takahashi, Tomohiko; Kagaya, Koji; and Nagashima, Masayoshi, 4,586,834, Cl. 400-120.000.
Nagata, Shuichi: *See—*
Akao, Takeshi; Nagata, Shuichi; Osaki, Katsumichi; and Okamoto, Yoshiharu, 4,587,127, Cl. 426-46.000.
Nagatomo, Shigeru; Yasuda, Yukio; Masuda, Nobuhito; Makiuchi, Hajime; and Okazaki, Masaki, to Fuji Photo Film Co., Ltd. Multilayer analysis element utilizing specific binding reaction. 4,587,102, Cl. 422-56.000.
Nagl, Alan: *See—*
Wong, Walter; Abrams, Robert; Nagl, Alan; and Repphun, William, 4,587,645, Cl. 369-75.100.
Naidoff, Robert J.: *See—*
Campbell, Bruce D.; Naidoff, Robert J.; and Tylor, Richard E., 4,586,783, Cl. 350-96.150.
Naito, Masao: *See—*
Morimoto, Kenji; Ikegami, Tamotsu; Naito, Masao; Kubo, Tateo; and Kizawa, Shinichi, 4,586,863, Cl. 413-14.000.
Nakada, Masashi: *See—*
Ohmura, Hideo; Oowa, Takeshi; Nakamura, Kunihiko; and Nakada, Masashi, 4,586,232, Cl. 29-426.300.
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano. Kozo, to Daikin Kogyo Co., Ltd. Fluorine-containing copolymers and films thereof. 4,587,316, Cl. 526-247.000.
Nakagawa, Tsuneo: *See—*
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,587,316, Cl. 526-247.000.
Nakagawa, Yuzo; Iwatani, Kouji; and Kadono, Tetsuro, to Shionogi & Company, Ltd. Chromatographic plate. 4,587,020, Cl. 210-658.000.
Nakahara, Akihiko; Sata, Toshikatsu; Shirouzu, Masaki; and Kunai, Kenji, to Tokuyama Soda Kabushiki Kaisha. Process for preparation of fluorine-containing compound having carboxyl group. 4,587,274, Cl. 522-126.000.
Nakai, Masaaki: *See—*
Tominaga, Shinji; Nakai, Masaaki; Inoue, Norihiro; Fujino, Akihiko; Inoue, Manabu; and Taniguchi, Nobuyuki, 4,586,800, Cl. 354-21.000.
Nakajima, Hideki, to Shimano Industrial Company Limited. Fishing reel. 4,586,674, Cl. 242-84.52B.
Nakajima, Hiroaki: *See—*
Katsumata, Tooru; Terashima, Kazutaka; Nakajima, Hiroaki; and Fukuda, Tsuguo, 4,586,979, Cl. 156-601.000.
Nakajima, Isao: *See—*
Higeta, Kazuya; Fujioka, Kazumasa; Nemoto, Takeo; Daikoku, Takahiro; and Nakajima, Isao, 4,587,399, Cl. 219-216.000.
Nakajima, Kichio: *See—*
Watanabe, Hiroshi; Izumi, Eiki; Aoyagi, Yukio; Honma, Kazuo; and Nakajima, Kichio, 4,586,330, Cl. 60-421.000.
Nakamura, Isao: *See—*
Kaneko, Tamaki; Takahashi, Yasuhiro; Okuzawa, Tsugio; Nakamura, Isao; and Ebata, Kohshi, 4,586,812, Cl. 355-24.000.
Nakamura, Kunihiko: *See—*
Ohmura, Hideo; Oowa, Takeshi; Nakamura, Kunihiko; and Nakada, Masashi, 4,586,232, Cl. 29-426.300.
Nakamura, Kyuzo; and Ota, Yoshifumi, to Nihon Shinku Gijutsu Kabushiki Kaisha. Magnetic recording medium and manufacturing process thereof. 4,587,179, Cl. 428-694.000.
Nakamura, Shohei; and Tuji, Yoshimasa, to Asahi Kasei Kogyo Kabushiki Kaisha. Mask element for selective sandblasting and a method. 4,587,186, Cl. 430-14.000.
Nakamura, Shunichi; and Dohi, Hiroyuki, to Mitsubishi Denki Kabushiki Kaisha. Printer for printing multi-standard television signals. 4,587,569, Cl. 358-296.000.
Nakamura, Takashi: *See—*
Igarashi, Yoshinobu; and Nakamura, Takashi, 4,586,351, Cl. 62-468.000.
Nakamura, Takeshi: *See—*
Hamano, Toshihisa; Nakamura, Takeshi; and Fuse, Mario, 4,587,171, Cl. 428-448.000.
Nakamura, Toshiaki: *See—*
Watanabe, Kiyohiko; Hattori, Yoshiyuki; Matsui, Kazuma; Takei, Toshihiro; Nakamura, Toshiaki; and Ohnishi, Syunsaku, 4,586,877, Cl. 417-365.000.
Nakamura, Toshio: *See—*
Sasaki, Yutaka; Nakamura, Toshio; Yamamoto, Hiroshi; Murata, Hiroshi; Nakamura, Yoshimi; and Takahashi, Naohiro, 4,587,226, Cl. 502-5.000.
Nakamura, Yoshimi: *See—*
Sasaki, Yutaka; Nakamura, Toshio; Yamamoto, Hiroshi; Murata, Hiroshi; Nakamura, Yoshimi; and Takahashi, Naohiro, 4,587,226, Cl. 502-5.000.
Nakane, Yasuaki; Kitagawa, Masataka; Kiyomiya, Tadashi; and Yanada, Tetsunosuke, to Sony Corporation. Information recording media. 4,587,533, Cl. 346-135.100.

Nakanishi, Kiyoshi: *See—*
Okumura, Takeshi; Nakanishi, Kiyoshi; and Matsushita, Souichi, 4,586,469, Cl. 123-308.000.

Nakanishi, Yasuji: *See—*
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.

Nakano, Fumio: *See—*
Isogai, Masato; Iwasaki, Kishiro; and Nakano, Fumio, 4,586,791, Cl. 350-341.000.

Nakano, Kouichi; Maruyama, Seiichi; Nakano, Seizo; and Sato, Masatomo, to Hitachi, Ltd. Zinc oxide lightning protector. 4,587,592, Cl. 361-127.000.

Nakano, Seizo: *See—*
Nakano, Kouichi; Maruyama, Seiichi; Nakano, Seizo; and Sato, Masatomo, 4,587,592, Cl. 361-127.000.

Nakano, Yoshiyuki: *See—*
Hosoda, Yuji; Kojima, Yoshio; Fujie, Masakatsu; Honma, Kazuo; Iwamoto, Taro; Nakano, Yoshiyuki; and Kamejima, Kohji, 4,586,335, Cl. 60-528.000.

Nakashima, Masami: *See—*
Matsuda, Koichi; Tamaki, Shohei; Harada, Hiroshi; Nakashima, Masami; and Fujiyoshi, Makoto, 4,587,287, Cl. 524-404.000.

Nakashima, Seiichiro; Inagaki, Shigemi; and Ito, Susumu, to Fanuc, Ltd. Wrist mechanism of an industrial robot. 4,586,868, Cl. 414-735.000.

Nakata, Muneo: *See—*
Matsuo, Kenichi; and Nakata, Muneo, 4,587,502, Cl. 335-85.000.

Nakatani, Masatoshi, to Takara Company, New York, Inc. Barber/-beauty chair. 4,586,749, Cl. 297-330.000.

Nakayama, Kiyoshi; Kato, Takashi; Sekiguchi, Tatsuo; Satoh, Mamoru; and Hayakawa, Koshiro, to Sanyo Electric Co., Ltd. Refrigerator cabinet. 4,586,348, Cl. 62-277.000.

Nakayama, Koichi; and Tanaka, Yoshito, to Toko, Inc. Waveform shaping circuit including I^2L element. 4,587,440, Cl. 307-268.000.

Nakayama, Shozo: *See—*
Kato, Yoshio; Nagamathu, Toshihiro; Tsurumi, Kazufumi; Nakayama, Shozo; and Kato, Kimio, 4,586,876, Cl. 417-269.000.

Nalco Chemical Company: *See—*
Srivatsa, Sanjay R.; Wetegrove, Robert L.; and Patzelt, Robert R., 4,587,023, Cl. 210-744.000.

Nall, Billy C.: *See—*
Nevarez, Enrique F., 4,586,677, Cl. 242-86.800.

Nall, Lawson H., to Tri Tool, Inc. Lathe tool for removing axial peripheral irregularity from surface of cylindrical workpiece. 4,586,407, Cl. 82-1.00C.

Nangle, Bruce K. Elastic wrap connecting with heat or cold pack. 4,586,506, Cl. 128-403.000.

Narahara, Toshikazu: *See—*
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, 4,587,162, Cl. 428-290.000.

Narita, Kiichi: *See—*
Mori, Takasuke; Miyazaki, Jun; Miyamoto, Manabu; and Narita, Kiichi, 4,586,558, Cl. 164-440.000.

Nath, Prem; and Fischer, Bela, to Energy Conversion Devices, Inc. Method of forming an electrically conductive member. 4,586,988, Cl. 204-15.000.

National Air Systems, Inc.: *See—*
Kaufman, Arnold S., 4,586,486, Cl. 126-299.00D.

National Machinery Company, The: *See—*
Berger, James R., 4,586,264, Cl. 72-405.000.

National Patent Development Co.: *See—*
Kliment, Charles K., 4,587,129, Cl. 426-534.000.

National Research Development Corp.: *See—*
Hider, Robert C.; Kontoghiorghes, George; Silver, Jack; and Stockham, Michael A., 4,587,240, Cl. 514-188.000.
Scales, John T., 4,586,932, Cl. 623-16.000.
Singleton, Terence, 4,586,494, Cl. 128-75.000.

National Semiconductor Corporation: *See—*
Koterasawa, Matsuro, 4,587,491, Cl. 330-268.000.
Widlar, Robert J., 4,587,494, Cl. 330-273.000.

NEC Corporation: *See—*
Iida, Norihiko, 4,587,664, Cl. 377-48.000.
Ishizuka, Hisao, 4,587,637, Cl. 365-189.000.
Itakura, Kazuharu; Matsumura, Fukuo; and Uejima, Hideyuki, 4,587,529, Cl. 346-76.0PH.
Okumura, Koichiro, 4,587,446, Cl. 307-473.000.
Tsurubuchi, Tetsuo; Sekiguchi, Toru; and Araki, Shigeru, 4,587,574, Cl. 360-14.300.

Negev Jojoba: *See—*
Wisniak, Jaime, 4,587,107, Cl. 423-10.000.

Neidleman, Saul L.: *See—*
Geigert, John; and Neidleman, Saul L., 4,587,217, Cl. 435-155.000.

Nelson, Gary A.; Godding, Patrick N.; Schumaker, Richard E.; Walter, Keith D.; Marrone, Edward S.; Gates, Stillman F.; Rigsbee, Everett O., III; and Teener, Michael D., to CXC Corporation. Distributed variable bandwidth switch for voice, data, and image communications. 4,587,651, Cl. 370-88.000.

Nelson, Rodney J.: *See—*
Cathey, Thaddeus F.; and Nelson, Rodney J., 4,586,915, Cl. 474-205.000.

Nemoto, Takeo: *See—*
Higeta, Kazuya; Fujioka, Kazumasa; Nemoto, Takeo; Daikoku, Takahiro; and Nakajima, Isao, 4,587,399, Cl. 219-216.000.

Nerlich, Ernst-Gunter, to Bochumer Eisenhutte Heintzmann GmbH & Co. KG. Hydraulic control arrangement. 4,586,424, Cl. 91-6.000.

Nerone, Louis R., to Reliance Electric Company. Power supply employing low power and high power series resonant converters. 4,587,604, Cl. 363-17.000.

Nertman, Inge L.: *See—*
Backman, Erik E.; Henrekson, Ulf A.; and Nertman, Inge L., 4,586,316, Cl. 53-449.000.

Nestec S.A.: *See—*
Monge, William A.; and Cerra, Joseph M., 4,586,314, Cl. 53-444.000.

Nestor, Charles R.; and Plyler, Robert G., to General Motors Corporation. Duplex insulation displacement terminal. 4,586,775, Cl. 339-97.00R.

Neubauer, Gerald: *See—*
Frank, Gerhard; and Neubauer, Gerald, 4,587,228, Cl. 502-185.000.

Neuf, George J.: *See—*
Goldenberg, Philip H.; Neuf, George J.; and Kirchner, Edward C., 4,586,662, Cl. 241-102.000.

Neumann, Thomas E.: *See—*
Miller, William H.; and Neumann, Thomas E., 4,587,061, Cl. 260-502.50F.

Neustadt, Bernard R.: *See—*
Gold, Elijah H.; Neustadt, Bernard R.; and Smith, Elizabeth M., 4,587,258, Cl. 514-412.000.

Nevarez, Enrique F., to Nevarez, Enrique F.; Crossman, Gordon W.; and Nall, Billy C. Take-up device for drip irrigation lines. 4,586,677, Cl. 242-86.800.

New Hampshire Flakeboard: *See—*
Caughey, Robert A., 4,586,442, Cl. 110-229.000.

New York Blood Center, Inc.: *See—*
Blomback, Birger; and Okada, Masahisa, 4,587,018, Cl. 210-484.000.

Newman, Allen R.; and Holley, Kenneth, to Nordson Corporation. Venturi powder pump having rotating diffuser. 4,586,854, Cl. 406-153.000.

Newsome, Reginald W., to Philip Morris Incorporated. Cigarette pack. 4,586,605, Cl. 206-267.000.

Nguyen, Huu-Can, to Equipements Automobiles Marshall. Method for the self-adaptive control of the angle of ignition advance of a thermal engine having positive ignition. 4,586,473, Cl. 123-419.000.

Niagara Machine & Tool Works: *See—*
Reinhorn, Andrei; and Trautman, George H., Jr., 4,586,361, Cl. 72-389.000.

Nichol, Charles A.; Reinhard, John F., Jr.; Smith, Gary K.; and Bigham, Eric C., to Burroughs Wellcome Co. Biopterin analogs. 4,587,340, Cl. 544-258.000.

Nicholas, James W.: *See—*
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,587,075, Cl. 264-573.000.

Nicholson Division, Datron Systems, Inc.: *See—*
Innes, Donn, 4,586,735, Cl. 285-354.000.

Nicholson, Harold L.: *See—*
Warfel, David R.; and Nicholson, Harold L., 4,587,330, Cl. 528-490.000.

Nicholson, Patrick S.; and Yamashita, Kimihiro, to Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources. Hydronium (H_3O^+) polycrystalline superionic conductors and method (ion exchange) of making same. 4,586,991, Cl. 204-61.000.

Nickisch, Klaus: *See—*
Bittler, Dieter; Laurent, Henry; Nickisch, Klaus; and Wiechert, Rudolf, 4,587,235, Cl. 514-178.000.

Nielsen, Robert C.; Aiken, John A., Jr.; and Herzik, Aubrey M., to International Business Machines Corp. Automatic text adjustment. 4,587,631, Cl. 364-900.000.

Niemi, Jouko. Pressure chamber grinder equipment. 4,586,661, Cl. 241-34.000.

Nifco Inc.: *See—*
Shimbara, Sakuzo, 4,586,761, Cl. 312-319.000.

Nihei, Ryo, to Fanuc, Ltd. Industrial robot hand. 4,586,869, Cl. 414-736.000.

Nihon Shinku Gijutsu Kabushiki Kaisha: *See—*
Nakamura, Kyuzo; and Ota, Yoshifumi, 4,587,179, Cl. 428-694.000.

Nihon Tokushu Noyaku Seizo K.K.: *See—*
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Shiokawa, Kozo; Morishima, Norihisa; and Goto, Toshio, 4,586,951, Cl. 71-92.000.

Niigata Engineering Co., Ltd.: *See—*
Takahashi, Susumu, 4,586,537, Cl. 137-614.040.

Niimi, Koji; and Kondo, Takayasu, to Nippon Gakki Seizo Kabushiki Kaisha. Noise elimination device. 4,587,620, Cl. 364-574.000.

Niito Chemical Industry Co., Ltd.: *See—*
Sasaki, Yutaka; Nakamura, Toshio; Yamamoto, Hiroshi; Murata, Hiroshi; Nakamura, Yoshimi; and Takahashi, Naohiro, 4,587,226, Cl. 502-5.000.

Nillesen, Antonius H. H. J.: *See—*
Doornhein, Laurens; Raven, Johannes G.; Welles, Petrus W. G.; Annegarn, Marcellinus J. J. C.; and Nillesen, Antonius H. H. J., 4,587,357, Cl. 358-140.000.

Nilsson, Jack E., Sr.; and Cochran, Charles D. Solar energy power generation system. 4,586,334, Cl. 60-524.000.

Nilsson, Sven, to SKF Nova AB. Motion transmitting mechanism. 4,586,392, Cl. 74-89.150.

Nippon Air Brake Co., Ltd.: *See—*
Kitagawa, Yoshihiro, 4,586,754, Cl. 303-22.00R.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Kato, Mitsumi; and Futamase, Tsuyoshi, 4,586,417, Cl. 84-1.170.

Niimi, Koji; and Kondo, Takayasu, 4,587,620, Cl. 364-574.000.
Nippon Kogaku K. K.: *See—*
Kudo, Koichi; Ogawa, Hidehiro; and Kawahara, Atsushi, 4,587,416, Cl. 250-204.000.
Tanimoto, Akikazu, 4,586,822, Cl. 356-394.000.
Nippon Light Metal Co. Ltd.: *See—*
Uesaka, Susumu; and Harada, Noriyuki, 4,586,826, Cl. 366-144.000.
Nippon Notion Kogyo Co., Ltd.: *See—*
Oura, Hiroshi, 4,586,641, Cl. 227-15.000.
Nippon Oil Company, Limited: *See—*
Yamaoka, Noboru; Kezuka, Seiju; Iida, Moriya; Miyoshi, Mituji; and Matsuura, Kazuo, 4,587,039, Cl. 252-511.000.
Yuasa, Hitoshi; Matsuno, Mitsuo; and Imai, Hirosuke, 4,587,057, Cl. 260-453.000.
Nippon Petrochemicals Company, Limited: *See—*
Inoue, Takashi; Miyoshi, Mituji; Matsuura, Kazuo; and Yamamoto, Kaoru, 4,587,318, Cl. 526-282.000.
Nippon Sheet Glass Co., Ltd.: *See—*
Kouichi, Maeda; Masaaki, Funaki; Motoaki, Yoshida; and Yasuji, Ohtsuka, 4,587,065, Cl. 264-1.500.
Nippon Soda Co. Ltd.: *See—*
Morikawa, Takao; Kobayasi, Tosio; Kataoka, Masayuki; and Mori, Atsushi, 4,587,201, Cl. 430-284.000.
Nippon Telegraph & Telephone Public Corp.: *See—*
Amemiya, Yoshihito; Sugeta, Takayuki; and Mizushima, Yoshihiko, 4,587,547, Cl. 357-59.000.
Kyoto, Michihisa; Yoshioka, Naoki; Tanaka, Gotaro; Watanabe, Minoru; Shimba, Hiroshi; and Inagaki, Nobuo, 4,586,943, Cl. 65-3.120.
Nippondenso Co., Ltd.: *See—*
Ikeya, Seizi; and Tabuchi, Tsuyoshi, 4,586,560, Cl. 164-457.000.
Isomura, Shigenori; and Kaji, Yasumasa, 4,586,479, Cl. 123-492.000.
Watanabe, Kiyohiko; Hattori, Yoshiyuki; Matsui, Kazuma; Takei, Toshihiro; Nakamura, Toshiaki; and Ohnishi, Syunsaku, 4,586,877, Cl. 417-365.000.
Nishida, Masamitsu: *See—*
Yokotani, Yoichirou; Kato, Junichi; Nishida, Masamitsu; Ouchi, Hiromu; and Nitta, Tsuneharu, 4,586,972, Cl. 156-89.000.
Nishida, Minoru: *See—*
Obara, Takashi; Osawa, Kazunori; Nishida, Minoru; Sakata, Kei; and Kuguminato, Hideo, 4,586,965, Cl. 148-12.00D.
Nishida, Mitsuhiro: *See—*
Inao, Hiroshi; and Nishida, Mitsuhiro, 4,586,880, Cl. 417-424.000.
Nishigaki, Kenichi: *See—*
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,095, Cl. 419-13.000.
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, 4,587,174, Cl. 428-552.000.
Nishiguchi, Yoichi: *See—*
Sasaki, Kazuo; Nishiguchi, Yoichi; and Saito, Shinzo, 4,586,650, Cl. 229-137.000.
Nishikawa, Norio: *See—*
Kurosaki, Tomihiro; and Nishikawa, Norio, 4,587,063, Cl. 556-146.000.
Nishimatsu, Masaharu; Ide, Toshiaki; Arioka, Hiroyuki; and Kubota, Yuichi, to TDK Corporation. Magnetic recording medium. 4,587,150, Cl. 428-141.000.
Nishimura, Kosuke; and Kataoka, Yoshiro, to Sharp Kabushiki Kaisha. Information processing device. 4,587,409, Cl. 235-380.000.
Nishimura, Yukuo: *See—*
Hirai, Yutaka; Tomida, Yoshinori; Matsuda, Hiroshi; and Nishimura, Yukuo, 4,586,980, Cl. 156-655.000.
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Suzuki, Tadashi, to Matsushita Electric Industrial Co., Ltd. Planar heating unit. 4,587,402, Cl. 219-343.000.
Nishino, Seiji: *See—*
Ogura, Toyosaku; and Nishino, Seiji, 4,586,220, Cl. 24-433.000.
Nishio, Haruko, legal representative: *See—*
Samejima, Yasushi; Shiga, Minoru; Kano, Toshiji; Yamada, Kiyoshi; and Nishio, Tsutomu, deceased, 4,586,994, Cl. 204-98.000.
Nishio, Tsutomu, deceased: *See—*
Samejima, Yasushi; Shiga, Minoru; Kano, Toshiji; Yamada, Kiyoshi; and Nishio, Tsutomu, deceased, 4,586,994, Cl. 204-98.000.
Nishioka, Takeshi: *See—*
Minami, Satoyuki; Tanaka, Kazuhiro; and Nishioka, Takeshi, 4,587,071, Cl. 264-210.700.
Nishioka, Yoichi: *See—*
Kato, Masakazu; Nishioka, Yoichi; and Kaifu, Katsuaki, 4,587,188, Cl. 430-58.000.
Nishizawa, Jun-ichi: *See—*
Imai, Masaharu; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,587,562, Cl. 358-212.000.
Nishizawa, Tetuo; Asano, Seiji; Ishiguro, Minoru; Komori, Masanoshin; Tobioka, Takashi; Yoshida, Toshio; and Hara, Hiroshi, to Fuji Photo Film Co., Ltd. Mode changing mechanism for pre-winding type photographic camera. 4,586,801, Cl. 354-173.100.
Niskanen, Erkki P., to Erkki Niskanen Oy. Spindle valve for a tube system for liquids. 4,586,538, Cl. 137-625.500.
Nissan Motor Company, Limited: *See—*
Matsui, Tatsuhiko; Aida, Hiroyuki; Watanabe, Akira; and Oohazama, Tsuneyoshi, 4,586,579, Cl. 180-69.210.
Sawamura, Keiichi; Eto, Yoshiyuki; Mine, Junichi; and Masuda, Koji, 4,587,231, Cl. 502-304.000.
Shibahata, Yasuji; Tsubota, Yasumasa; and Uno, Takaaki, 4,586,581, Cl. 180-140.000.
Nisshin Flour Milling Co., Ltd.: *See—*
Otake, Noboru; Seto, Haruo; Sasaki, Tetsuo; Sugita, Masanori; and Hiramoto, Shigeru, 4,587,237, Cl. 514-183.000.
Nisshin Kogyo Kabushiki Kaisha: *See—*
Idesawa, Isao, 4,586,589, Cl. 188-79.50K.
Nisshin Steel Company, Ltd.: *See—*
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.
Nissin Electric Co., Ltd.: *See—*
Morishita, Masao; and Masuda, Toshimi, 4,586,342, Cl. 62-3.000.
Nitta, Tsuneharu: *See—*
Yokotani, Yoichirou; Kato, Junichi; Nishida, Masamitsu; Ouchi, Hiromu; and Nitta, Tsuneharu, 4,586,972, Cl. 156-89.000.
Nittel, Walter F., to Josef Nittel GmbH & Co KG. Resilient inner liner for lining of transport or storage containers. 4,586,628, Cl. 220-470.000.
Niwa, Hajime; and Hironaka, Katsumi, to AOI Chemical, Inc. Method for manufacture of waterproof fibrous plate. 4,587,070, Cl. 264-122.000.
Nixdorf Computer AG: *See—*
Burchart, Joachim, 4,586,903, Cl. 434-114.000.
Noack, Horst-Guenter: *See—*
Corzilius, Rolf; Noack, Horst-Guenter; and Stollbrink, Johann, 4,586,872, Cl. 415-219.00C.
Noakes, Timothy J.: *See—*
Johnson, Graham C.; and Noakes, Timothy J., 4,586,657, Cl. 239-691.000.
Nobis, Peter: *See—*
Buschkens, Guido; and Nobis, Peter, 4,586,343, Cl. 62-55.000.
Nogami, Susumu; Suzuki, Yukio; Takahashi, Hiroshi; and Otsuka, Kan, to Toyota Jidosha Kabushiki Kaisha. Air-fuel ratio control method and apparatus for an internal combustion engine. 4,586,478, Cl. 123-489.000.
Nogle, Thomas D., to Chrysler Corporation. Transmission speed sensor arrangement. 4,586,401, Cl. 74-752.00A.
Noguchi, Akio, to Fuji Xerox Co., Ltd. Thermal head driving/control apparatus. 4,587,530, Cl. 346-76.0PH.
Noguchi, Masaru; and Ohga, Akihiro, to Fuji Photo Film Co., Ltd. Light beam scanning device for correcting scanning speed. 4,587,420, Cl. 250-235.000.
Noguchi, Matsusaburo; Yamamoto, Mikio; and Furukawa, Shinichi, to Oki Electric Industry Co., Ltd. Dry-type developing device for electrophotography. 4,586,461, Cl. 118-663.000.
Nojiri, Hironobu: *See—*
Yamamoto, Ryuichi; and Nojiri, Hironobu, 4,586,679, Cl. 242-176.000.
Nomoto, Tsugio: *See—*
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, 4,586,891, Cl. 425-526.000.
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, 4,586,892, Cl. 425-531.000.
Nonaka, Yasuhiko: *See—*
Inoue, Eisuke; Nonaka, Yasuhiko; and Yamamoto, Masanao, 4,587,456, Cl. 313-366.000.
Nordson Corporation: *See—*
Hollstein, Thomas E.; Herrig, Robert A.; Fulkerson, Terrence M.; and Sharpless, John, 4,586,386, Cl. 73-861.040.
Newman, Allen R.; and Holley, Kenneth, 4,586,854, Cl. 406-153.000.
Norman, Robert M.; and Wade, Franklin C. Underwater trenching system. 4,586,850, Cl. 405-163.000.
Norman, Timothy H., to Spafax Holdings, plc. Storage/display system. 4,586,618, Cl. 211-133.000.
North American Container Corporation: *See—*
Grigsby, John M., 4,586,627, Cl. 220-443.000.
Northern Telecom Limited: *See—*
Shannon, Michael A.; and Manders, Steven D., 4,587,133, Cl. 427-9.000.
Norton Christensen, Inc.: *See—*
Grappendorf, Richard H., 4,586,574, Cl. 175-329.000.
Noto, Vincent H. Reflective solar tracking system. 4,586,488, Cl. 126-425.000.
Novatome: *See—*
Malaval, Claude, 4,587,081, Cl. 376-287.000.
Nowak, James M.: *See—*
Espelage, Paul M.; Lippitt, David L.; and Nowak, James M., 4,587,474, Cl. 318-709.000.
Nozaki, Shinya: *See—*
Kobayashi, Masayoshi; Nozaki, Shinya; Yamada, Keiichi; and Kobayashi, Tadashi, 4,586,480, Cl. 123-506.000.
Nozaki, Yukimasa: *See—*
Ono, Hideo; Nozaki, Yukimasa; and Harada, Setsuo, 4,587,333, Cl. 544-21.000.
NSK-Warner K.K.: *See—*
Saito, Hiroyuki; and Ueda, Takeo, 4,586,678, Cl. 242-107.40D.
Nuclear Protection Systems, Inc.: *See—*
Hastings, Richard P., 4,586,849, Cl. 405-128.000.
N.V. Nederlandsche Apparatenfabriek NEDAP: *See—*
Hoeksma, Gerben S., 4,587,506, Cl. 336-178.000.
Nygren, Ingemar, to Svenska Varv Vindenergi AB. Soft shaft interconnecting device. 4,586,400, Cl. 74-675.000.

Nyitrai, Jozsef: *See*—
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.

Nylund, Olov: *See*—
Borrman, Bo; and Nylund, Olov, 4,587,093, Cl. 376-444.000.

Nystrom, Wilford O.; Riedel, Kenneth E.; and Doerschner, David L., to Hollister Incorporated. Process of forming an external male catheter and applicator. 4,586,974, Cl. 156-165.000.

Oakley, Peter J.; Stockham, Norman R.; and Miller, Heidi M., to Welding Institute, The. Bonding leads to semiconductor devices. 4,587,395, Cl. 219-121.0LD.

Obara, Takashi; Osawa, Kazunori; Nishida, Minoru; Sakata, Kei; and Kuguminato, Hideo, to Kawasaki Steel Corporation. Production of a base steel sheet to be surface-treated which is to produce no stretcher strain. 4,586,965, Cl. 148-12.00D.

Oberg, Hans, to Vanguard Properties Co. Apparatus to produce shingles. 4,586,612, Cl. 209-555.000.

Obersat, Adam. Attachment for coupling detachable and permanently installed components of dental prostheses to each other. 4,586,902, Cl. 433-177.000.

O'Brien, Thomas F., to Stearns Catalytic World Corporation. Control of sulfates in membrane cell chlor-alkali process. 4,586,993, Cl. 204-98.000.

Obstfelder, Gunther; Kreutze, Gerhard; and Luttig, Winfried, to F & O Electronic Systems GmbH & Co. Method of printing, evaluating and checking the printing image of a printer and apparatus for carrying out said process. 4,587,411, Cl. 235-437.000.

Occidental Chemical Corporation: *See*—
Walker, Leigh E.; and Ranade, Gautam R., 4,587,297, Cl. 525-64.000.

Oce-Nederland, B.V.: *See*—
Everhardus, Roelof H.; Siebers, Theodorus J. H.; and Biermans, Martinus B. G. M., 4,587,193, Cl. 430-126.000.

Oda, Hitoshi: *See*—
Shimizu, Shigeo; Kato, Toshio; Oda, Hitoshi; and Shigeta, Masanobu, 4,587,178, Cl. 428-615.000.

Oda, Ronald L.; Beck, Jeffrey L.; Blubaugh, Robert M.; Harris, Gary R.; Shaw, Ricky L.; and Evans, Michael P., to Conoco Inc. Apparatus for the reclamation of slurry from the bottom of a storage silo. 4,586,852, Cl. 406-14.000.

Odagiri, Yoichi; and Sato, Tsuguo, to Sony Corporation. Method and apparatus for utilizing a drive tape. 4,587,575, Cl. 360-15.000.

Odaka, Kentaro, to Sony Corporation. Coded signal reproducing apparatus. 4,587,573, Cl. 360-10.300.

Odawara, Hiroyoshi: *See*—
Takai, Takao; Okada, Fumio; Odawara, Hiroyoshi; and Mitogawa, Fukumatsu, 4,586,320, Cl. 53-512.000.

Oestreich, Ulrich, to Siemens Aktiengesellschaft. SZ stranding method and apparatus. 4,586,327, Cl. 57-294.000.

Oetjen, Jurgen, to INA Walzlager Schaeffler KG. Rolling bearing for use with screwthreaded spindles. 4,586,832, Cl. 384-455.000.

O'Farrell, Thomas F.: *See*—
Preusch, Robert W.; O'Farrell, Thomas F.; and O'Neal, Ollie, Jr., 4,587,027, Cl. 252-73.000.

Officine Meccaniche Liguri de P. Lantero: *See*—
Lantero, Palmiro, 4,586,689, Cl. 248-570.000.

Ogawa, Hidehiro: *See*—
Kudo, Koichi; Ogawa, Hidehiro; and Kawahara, Atsushi, 4,587,416, Cl. 250-204.000.

Ogilvie Mills Ltd.: *See*—
Lane, Christopher C.; Anonychuk, Alexander B.; and Unger, Peter, 4,587,332, Cl. 536-102.000.

Ogoe, Samual A.; and Dick, Kevin F., to Dow Chemical Company, The. Carbonate polymes containing a polyether polyol metal salt complex. 4,587,310, Cl. 525-462.000.

Oguchi, Yukio, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Apparatus for controlling operation of an industrial robot. 4,587,618, Cl. 364-513.000.

Ogura, Toyosaku; and Nishino, Seiji, to Yoshida Kogyo K. K. Separable slide fastener. 4,586,220, Cl. 24-433.000.

Ohashi, Toneri: *See*—
Tanaka, Takeshi; Jotatsu, Masao; Higaki, Masaaki; Hamada, Toshimasa; Hashikawa, Tadashi; Ohasui, Toneri; and Togawa, Seigo, 4,586,664, Cl. 241-213.000.

Ohga, Akihiro: *See*—
Noguchi, Masaru; and Ohga, Akihiro, 4,587,420, Cl. 250-235.000.

Ohga, Yukiharu: *See*—
Takeda, Renzo; Miki, Kazuyoshi; Ohga, Yukiharu; Fuse, Motomasa; Hiramoto, Kazuo; and Aoyama, Motoo, 4,587,089, Cl. 376-428.000.

Ohishi, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Unitary air conditioner. 4,586,349, Cl. 62-296.000.

Ohkoshi, Akio: *See*—
Watanabe, Toshiro; and Ohkoshi, Akio, 4,587,553, Cl. 358-64.000.

Ohkoshi, Fumihiko; Hasegawa, Toshifumi; and Kanii, Norikazu, to Toyoda Koki Kabushiki Kaisha. Spindle head for a machine tool. 4,586,860, Cl. 409-233.000.

Ohman, Donald M., to Caterpillar Industrial Inc. Automatic hydraulic speed control. 4,586,331, Cl. 60-422.000.

Ohmi, Shohei, to Omi Kogyo Co., Ltd. Hole cutter. 4,586,857, Cl. 408-206.000.

Ohmori, Akira; Tomihashi, Nobuyuki; and Tamaru, Sinji, to Daikin Kogyo Co., Ltd. Films of a copolymer of an ester derived from a fluorine-containing alcohol. 4,587,165, Cl. 428-334.000.

Ohmura, Hideo; Oowa, Takeshi; Nakamura, Kunihiko; and Nakada, Masashi, to Tokyo Shibaura Denki Kabushiki Kaisha. Paper sheet processing apparatus. 4,586,232, Cl. 29-426.300.

Ohnishi, Syunsaku: *See*—
Watanabe, Kiyohiko; Hattori, Yoshiyuki; Matsui, Kazuma; Takei, Toshihiro; Nakamura, Toshiaki; and Ohnishi, Syunsaku, 4,586,877, Cl. 417-365.000.

Ohno, Eiji; Kimura, Kunio; Yamada, Noboru; and Akahira, Nobuo, to Matsushita Electric Industrial Co., Ltd. Optical information recording member comprising Au, TeO_2 and Te. 4,587,209, Cl. 430-526.000.

Ohno, Makoto: *See*—
Miyagi, Morio; Ohno, Makoto; and Kanaizumi, Masaru, 4,587,168, Cl. 428-369.000.

Ohno, Shigeru: *See*—
Saitoh, Keishi; Ohnuki, Yukihiko; and Ohno, Shigeru, 4,587,190, Cl. 430-85.000.

Ohnuki, Yukihiko: *See*—
Saitoh, Keishi; Ohnuki, Yukihiko; and Ohno, Shigeru, 4,587,190, Cl. 430-85.000.

Ohshima, Iwao: *See*—
Ohtani, Ryoichi; and Ohshima, Iwao, 4,587,543, Cl. 357-25.000.

Ohshima, Michio: *See*—
Okamoto, Toshiro; and Ohshima, Michio, 4,587,011, Cl. 208-129.000.

Ohta, Masutomi; and Kawana, Fumihiro, to Hitachi, Ltd. Code signal generator or detector for video frame code. 4,587,521, Cl. 340-825.300.

Ohta, Tomohisa; Dobashi, Akihiko; and Seki, Yasuyuki, to Hitachi Chemical Company, Ltd. Radiation curable pressure-sensitive adhesive composition. 4,587,313, Cl. 526-75.000.

Ohtani, Ryoichi; and Ohshima, Iwao, to Tokyo Shibaura Denki Kabushiki Kaisha. Method and device for detecting metal ions. 4,587,543, Cl. 357-25.000.

Ohtani, Takayuki: *See*—
Isobe, Mitsuo; Sakurai, Takayasu; Sawada, Kazuhiro; Iizuka, Tetsuya; Ohtani, Takayuki; and Aono, Akira, 4,587,638, Cl. 365-200.000.

Ohtomo, Seiya; Aoki, Minoru; and Kasai, Yoshio, to Pola Chemical Industries, Inc. Method for shaping or molding stick cosmetics. 4,587,072, Cl. 264-297.800.

Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, to Doryokuro Kakunenryo Kaihatsu Jigyodan; and Kabushiki Kaisha Kobe Seiko Sho. Method of stabilized operation of acid digestion kettle of tantalum. 4,587,098, Cl. 422-7.000.

Okada, Fumio: *See*—
Takai, Takao; Okada, Fumio; Odawara, Hiroyoshi; and Mitogawa, Fukumatsu, 4,586,320, Cl. 53-512.000.

Okada, Masahisa: *See*—
Blomback, Birger; and Okada, Masahisa, 4,587,018, Cl. 210-484.000.

Okamoto, Atsuki; and Takahashi, Masashi, to Sumitomo Metal Industries, Ltd. Method of producing cold-rolled steel sheet exhibiting improved press-formability. 4,586,966, Cl. 148-12.00C.

Okamoto, Toshiro; and Ohshima, Michio, to Mitsubishi Jukogyo Kabushiki Kaisha. Thermal cracking process for selectively producing petrochemical products from hydrocarbons. 4,587,011, Cl. 208-129.000.

Okamoto, Yoshiharu: *See*—
Akao, Takeshi; Nagata, Shuichi; Osaki, Katsumichi; and Okamoto, Yoshiharu, 4,587,127, Cl. 426-46.000.

Okanagan Turbo Sprayers Ltd.: *See*—
Bleasdale, William W.; and Boultbee, Frank E., 4,586,287, Cl. 47-1.700.

Okawa, Yogiro: *See*—
Taguchi, Kazuo; and Okawa, Yogiro, 4,586,458, Cl. 118-72.000.

Okazaki, Masaki: *See*—
Nagatomo, Shigeru; Yasuda, Yukio; Masuda, Nobuhito; Makiuchi, Hajime; and Okazaki, Masaki, 4,587,102, Cl. 422-56.000.

OKI Electric Industry Co., Inc.: *See*—
Kanamori, Takashi; Shibata, Susumu; Sawai, Hideo; and Kuroki, Kenji, 4,587,400, Cl. 219-216.000.

Oki Electric Industry, Co., Ltd.: *See*—
Hirao, Yoshikazu; and Umesaki, Shigeo, 4,587,655, Cl. 371-12.000.
Kato, Masakazu; Nishioka, Yoichi; and Kaifu, Katsuaki, 4,587,188, Cl. 430-58.000.
Noguchi, Matsusaburo; Yamamoto, Mikio; and Furukawa, Shinichi, 4,586,461, Cl. 118-663.000.
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, 4,587,568, Cl. 358-293.000.

Okumura, Ichiro; and Izukawa, Kazuhiro, to Canon Kabushiki Kaisha. Vibration wave motor having a vibrator of non-uniform elastic modulus. 4,587,452, Cl. 310-328.000.

Okumura, Koichiro, to NEC Corporation. Field effect transistor output circuit operable by a reduced amount of current. 4,587,446, Cl. 307-473.000.

Okumura, Takeshi; Nakanishi, Kiyoshi; and Matsushita, Souichi, to Toyota Jidosha Kabushiki Kaisha. Intake device of an internal combustion engine. 4,586,469, Cl. 123-308.000.

Okuzawa, Tsugio: *See*—
Kaneko, Tamaki; Takahashi, Yasuhiro; Okuzawa, Tsugio; Nakamura, Isao; and Ebata, Kohshi, 4,586,812, Cl. 355-24.000.

Olaer Industries S.A.: *See*—
De Loof, Jean P., 4,587,074, Cl. 264-516.000.

Olbrich, Hubertus: *See—*
Anhauser, Dieter; Kreitlow, Gerhard; Olbrich, Hubertus; Reinhold, Karl-Heinz; Simon, Gunter; and Gockel, Karl-Heinz, 4,587,146, Cl. 428-41.000.

Olin Corporation: *See—*
Shapiro, Eugene; and Mandigo, Frank N., 4,586,967, Cl. 148-31.500.

Ollis, Frederick R.; and Tengler, John N., to Associated Enterprises, Inc. Cable termination assembly and wire stripping apparatus and method. 4,586,776, Cl. 339-105.000.

Olsson, Lars-Goran: *See—*
Claren, Jan S.; and Olsson, Lars-Goran, 4,587,219, Cl. 435-288.000.

Olsson, Olle: *See—*
Hallstrom, Bengt; Olsson, Olle; Bolmstedt, Ulf; and Johansson, Bjorn-Olow, 4,586,565, Cl. 165-167.000.

Olympus Optical Co., Ltd.: *See—*
Banno, Taiichi, 4,587,624, Cl. 364-571.000.
Imai, Masaharu; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,587,562, Cl. 358-212.000.

Omi Kogyo Co., Ltd.: *See—*
Ohmi, Shohei, 4,586,857, Cl. 408-206.000.

OMNET Associates: *See—*
Omura, Jimmy K.; and Massey, James L., 4,587,627, Cl. 364-754.000.

Omori, Mitsugu: *See—*
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,587,316, Cl. 526-247.000.

Omron Tateisi Electronics Co.: *See—*
Agatahama, Shunichi; and Yamashita, Shoichi, 4,587,501, Cl. 335-80.000.
Masuda, Kiyoshi, 4,587,379, Cl. 179-2.0CA.
Matsuo, Kenichi; and Nakata, Muneo, 4,587,502, Cl. 335-85.000.

Omura, Jimmy K.; and Massey, James L., to OMNET Associates. Computational method and apparatus for finite field arithmetic. 4,587,627, Cl. 364-754.000.

Oncken, Harold W. Drill press vise assembly. 4,586,701, Cl. 269-25.000.

O'Neal, Glenn B.: *See—*
Dibrell, Edwin W.; O'Neal, Glenn B.; and Schaich, Wilbur A., 4,586,426, Cl. 91-176.000.

O'Neal, Ollie, Jr.: *See—*
Preusch, Robert W.; O'Farrell, Thomas F.; and O'Neal, Ollie, Jr., 4,587,027, Cl. 252-73.000.

Ono, Hideo; Nozaki, Yukimasa; and Harada, Setsuo, to Takeda Chemical Industries, Ltd. Cephalosporins and their production. 4,587,333, Cl. 544-21.000.

Ono, Kimizo; Takenaka, Shinya; and Sunago, Katsuyoshi, to Sumitomo Electric Industries, Ltd. Waveguide for laser beams. 4,586,795, Cl. 350-620.000.

Ono, Masahiro: *See—*
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, 4,587,162, Cl. 428-290.000.

Ono, Michio; Morigaki, Masakazu; Kamio, Takayoshi; Aoki, Kozo; and Furuya, Kazuhiko, to Fuji Photo Film Co., Ltd. Color photographic silver halide light-sensitive material consisting of a specified hydroquinone derivative. 4,587,210, Cl. 430-555.000.

Ono, Tetsuo; Watanabe, Yoshio; Matsuno, Hiromitsu; Kato, Yasuo; Murayama, Seiichi; and Mikoshiba, Shigeo, to Hitachi, Ltd. Low-pressure mercury vapor discharge lamp. 4,587,453, Cl. 313-25.000.

Onodera, Kaoru: *See—*
Kadowaki, Takashi; and Onodera, Kaoru, 4,587,208, Cl. 430-507.000.

Oohazama, Tsuneyoshi: *See—*
Matsui, Tatsuhiko; Aida, Hiroyuki; Watanabe, Akira; and Oohazama, Tsuneyoshi, 4,586,579, Cl. 180-69.210.

Oowa, Takeshi: *See—*
Ohmura, Hideo; Oowa, Takeshi; Nakamura, Kunihiko; and Nakada, Masasshi, 4,586,232, Cl. 29-426.300.

Orbeck, Gary A., to BTU Engineering Corporation. Multi-zone furnace system. 4,586,898, Cl. 432-122.000.

Original Vogelbauer Corporation, The: *See—*
Braeuner, Horst, 4,586,463, Cl. 119-17.000.

Osaki, Katsumichi: *See—*
Akao, Takeshi; Nagata, Shuichi; Osaki, Katsumichi; and Okamoto, Yoshiharu, 4,587,127, Cl. 426-46.000.

Osamu Akiyama: *See—*
Shimomura, Kenji, 4,587,273, Cl. 521-107.000.

Osawa, Kazunori: *See—*
Obara, Takashi; Osawa, Kazunori; Nishida, Minoru; Sakata, Kei; and Kuguminato, H[illegible], 4,586,965, Cl. 148-12.00D.

Osawa, Michitaka; Ando, [illegible]nio; and Maekawa, Hitoshi, to Hitachi, Ltd. Cascode amplifier with an improved biasing arrangement. 4,587,495, Cl. 330-311.000.

Osborne, Francis J.: *See—*
Sawicki, Frank S.; Mital, Mark D.; and Osborne, Francis J., 4,586,945, Cl. 65-138.000.

Osborne, Thomas A., to Cook, Incorporated. Percutaneous entry needle. 4,586,926, Cl. 604-272.000.

Oshida, Mamoru: *See—*
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, 4,586,891, Cl. 425-526.000.
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, 4,586,892, Cl. 425-531.000.

Oskoui, Rayyaneh M., to Weed Instruments Co., Inc. Method for assembling resistance temperature detector. 4,586,246, Cl. 29-612.000.

Osmont, Gilles J. N.; and Bourras-Laspelades, Jacques A. Y., to Sereg S.A. Method and apparatus for inspection by radioactive gage of a moving strip of material, in particular a strip of rubber for tires. 4,587,667, Cl. 378-58.000.

Ota, Yoshifumi: *See—*
Nakamura, Kyuzo; and Ota, Yoshifumi, 4,587,179, Cl. 428-694.000.

Otake, Noboru; Seto, Haruo; Sasaki, Tetsuo; Sugita, Masanori; and Hiramoto, Shigeru, to Nisshin Flour Milling Co., Ltd. Mycotrienin-related compounds. 4,587,237, Cl. 514-183.000.

Otsuka, Kan: *See—*
Nogami, Susumu; Suzuki, Yukio; Takahashi, Hiroshi; and Otsuka, Kan, 4,586,478, Cl. 123-489.000.

Ouchi, Hiromu: *See—*
Yokotani, Yoichirou; Kato, Junichi; Nishida, Masamitsu; Ouchi, Hiromu; and Nitta, Tsuneharu, 4,586,972, Cl. 156-89.000.

Oura, Hiroshi, to Nippon Notion Kogyo Co., Ltd. Apparatus for attaching pairs of fastener elements onto garment fabrics. 4,586,641, Cl. 227-15.000.

Outmans, H. Donald, to Union Oil Company of California. Determining the effect of fluid flow through permeable media. 4,586,376, Cl. 73-432.00R.

Owen, Leonard J.: *See—*
Lothmann, Werner; Owen, Leonard J.; and Simmons, Reginald J., 4,586,773, Cl. 339-91.00R.

Oxford Magnet Technology Limited: *See—*
Brown, Ian J.; Bird, John M.; McDougall, Ian L.; and Black, David, 4,587,504, Cl. 335-216.000.

Oy T[illegible]mpella AB: *See—*
Huke, Risto J. A., 4,586,390, Cl. 73-864.730.
Rajakallio, Pauli; and Hyvonen, Pentti, 4,586,571, Cl. 173-43.000.

Ozaki, Osamu, to Sanyei Corporation. Synchronous motor rotor. 4,587,450, Cl. 310-156.000.

Ozawa, Toshiyuki; Uotani, Osamu; and Hayashi, Rieko, to Lion Corporation. Oral composition and abrasive therefor. 4,587,120, Cl. 424-57.000.

Pain Suppression Labs, Inc.: *See—*
Liss, Saul; and Liss, Bernard, 4,586,509, Cl. 128-422.000.

Pali, Christopher, to Essex Group, Inc. Assembly for effecting vertical and rotational motion. 4,586,415, Cl. 83-564.000.

Panitz, Paul: *See—*
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Potter, James C.: *See*—
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Preusch, Robert W.; O'Farrell, Thomas F.; and O'Neal, Ollie, Jr., to United States Movidyn Corporation. Antifreeze for potable water. 4,587,027, Cl. 252-73.000.

Preusser, Gerhard; Schulze, Martin; Emmrich, Gerd; and Schneider, Hans-Christoph, to Krupp-Koppers GmbH. Method of recovering pure aromatic substances. 4,586,986, Cl. 203-22.000.

Price, Jacqueline S. Compositions and methods for reducing pest infestation. 4,587,123, Cl. 424-195.100.

Price, Marvin L. Apparatus for lifting and handling an object. 4,586,744, Cl. 294-92.000.

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Radford, Kenneth C., to Westinghouse Electric Corp. Coating a nuclear fuel with a burnable poison. 4,587,088, Cl. 376-419.000.

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Ragland, Owtis J., Jr.: *See*—
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Rajakallio, Pauli; and Hyvonen, Pentti, to Oy Tampella AB. Method of and arrangement for positioning of a drilling apparatus. 4,586,571, Cl. 173-43.000.

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Randall, James C.; and Zoepfl, Frederick J., to Phillips Petroleum Company. Polymer and irradiation treatment method. 4,586,995, Cl. 522-5.000.

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Rasmussen, Glen L., to Boeing Company, The. Method of plating a conductive substrate surface with silver. 4,586,989, Cl. 204-15.000.

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Rath, Hans P.: *See*—
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Reid, Alister U., to Aur Hydropower Limited. Water engine. 4,586,333, Cl. 60-506.000.

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Rengo Co., Ltd.: *See—*
Tokuno, Masateru; Sawada, Tetsuya; Hoshiyama, Hidetoshi; and Yoneda, Toshihiro, 4,586,434, Cl. 101-178.000.
Tokuno, Masateru; Sawada, Tetsuya; and Ishii, Yoshihiro, 4,586,673, Cl. 242-58.600.

Renner, Alfred, to Ciba-Geigy Corporation. Crosslinked polymers obtainable by cationic polymerization and formed from unsaturated bicyclic imides. 4,587,317, Cl. 526-259.000.

Repphun, William: *See—*
Wong, Walter; Abrams, Robert; Nagl, Alan; and Repphun, William, 4,587,645, Cl. 369-75.100.

Research Corporation: *See—*
Regen, Steven L., 4,587,055, Cl. 260-413.000.

Rexnord Inc.: *See—*
Hodlewsky, Wasyly G., 4,586,601, Cl. 198-690.100.

Rhoades, Rex V.; and Finley, Charles M., to Rohrback Corporation. Corrosion measurement with multiple compensation. 4,587,479, Cl. 324-65.0CR.

Rice, Gary; D'Silva, Arthur P.; and Fassel, Velmer A., to United States of America, Energy. Atmospheric pressure helium afterglow discharge detector for gas chromatography. 4,586,368, Cl. 73-23.100.

Richards, Waldo J.: *See—*
Fisk, Dale E.; Griffith, Robert L.; Homan, Merle E.; Radin, George; and Richards, Waldo J., 4,587,612, Cl. 364-200.000

Richey, Thomas: *See—*
Kennedy, Joe H.; Holland, A. Ronald; Richey, Thomas; and Alsup, James D., Jr., 4,586,762, Cl. 312-330.00R.

Richter Gedeon Vegyeszeti Gyar R.T.: *See—*
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.

Richter Gedeon Vegyeszeti Gyar RT: *See—*
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.

Ricoh Company, Ltd.: *See—*
Kaneko, Tamaki; Takahashi, Yasuhiro; Okuzawa, Tsugio; Nakamura, Isao; and Ebata, Kohshi, 4,586,812, Cl. 355-24.000.
Kubo, Keishi; Miyashita, Takaaki; and Yasumori, Akiyoshi, 4,586,811, Cl. 355-14.00R.
Yuasa, Kazuhiro, 4,586,807, Cl. 355-3.0BE.

Riedel, Kenneth E.: *See—*
Nystrom, Wilford O.; Riedel, Kenneth E.; and Doerschner, David L., 4,586,974, Cl. 156-165.000.

Riegel, Ulrich: *See—*
Hille, Martin; Friede, Wolfgang; Wittkus, Heinz; Engelhardt, Friedrich; and Riegel, Ulrich, 4,587,283, Cl. 524-3.000.

Riggs, Gary T.: *See—*
Gould, Sheldon D.; and Riggs, Gary T., 4,586,923, Cl. 604-95.000.

Rigsbee, Everett O., III: *See—*
Nelson, Gary A.; Godding, Patrick N.; Schumaker, Richard E.; Walter, Keith D.; Marrone, Edward S.; Gates, Stillman F.; Rigsbee, Everett O., III; and Teener, Michael D., 4,587,651, Cl. 370-88.000.

Riley, Terence J.: *See—*
Berthold, Joseph E.; Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., 4,587,545, Cl. 357-38.000.
Hartman, Adrian R.; Riley, Terence J.; and Shackle, Peter W., 4,587,656, Cl. 357-38.000.

Ring, Charles E.: *See—*
Walter, Leo; Ring, Charles E.; Seppala, Bryan R.; Kennelly, Patric M.; and Marnie, James P., 4,586,778, Cl. 339-221.00R.

Risdon Corporation: *See—*
Seidler, David, 4,586,519, Cl. 132-83.00R.

Rishel, Paul E.; LaGrou, Allan D.; and Seefried, Thomas E., to General Motors Corporation. Adjustable vehicle brake proportioning system. 4,586,590, Cl. 188-345.000.

Rittenhouse, James L. Releasable blade, blade holder and blade-holder combination. 4,586,257, Cl. 30-276.000.

Riva, Mario: *See—*
Cantarelli, Giorgio; Picciola, Giampaolo; Ravenna, Franco; and Riva, Mario, 4,587,248, Cl. 514-255.000.

Rivoallon, Jean, to Societe Francaise Hoechst. Composition for facing in the building field. 4,586,959, Cl. 106-84.000.

Robert Bosch GmbH: *See—*
Hofmeister, Werner, 4,586,766, Cl. 339-45.00M.
Klinger, Horst; Lehmann, Werner; and Zeuch, Michael, 4,586,470, Cl. 123-367.000.
Reimers, Ulrich, 4,587,560, Cl. 358-166.000.

Robertson, David K., to HEI, Inc. Photo-optic transducing head assembly. 4,587,421, Cl. 250-239.000.

Robinson, Daniel T., to Kempsmith Machine Co. File hinge folding assembly. 4,586,917, Cl. 493-241.000.

Robinson, Melvin E. R.: *See—*
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,587,075, Cl. 264-573.000.

Roby, Robert E.: *See—*
Collins, Michael S.; and Roby, Robert E., 4,587,121, Cl. 424-87.000.

Rockwell International Corporation: *See—*
Davis, James A., 4,587,657, Cl. 372-74.000.
Fakler, Lyle D.; and Kaith, Irving, 4,586,226, Cl. 29-157.00R.
Hogge, Charles R., Jr., 4,587,653, Cl. 371-6.000.
Schorr, Ian A., 4,587,437, Cl. 307-109.000.

Rodam, S.A.: *See—*
Dahan, Jose , 4,586,621, Cl. 215-11.00R.

Rodenbeck, Philip G., to General Electric Company. Flyer method. 4,586,667, Cl. 242-7.030.

Rodman, Paul K., to Prime Computer, Inc. Address translation systems for high speed computer memories. 4,587,610, Cl. 364-200.000.

Rodolf, Charles A. Tool kit for installing transmission seals. 4,586,228, Cl. 29-235.000.

Rodriguez, Tomas, to Polaroid Corporation. Method and apparatus for forming magnetic recording media. 4,587,066, Cl. 264-22.000.

Rodseth, William G., to Illinois Tool Works Inc. Electrically insulating fastener for heat sinks of different thicknesses. 4,587,377, Cl. 174-16.0HS.

Roes, John B.; Winkles, Billy B.; Kelly, Guy M.; Spani, Wayne M.; and Schuster, Donald W., to Cubic Western Data. Currency note validator. 4,587,434, Cl. 250-556.000.

Rogers, Thomas A., to Mobil Oil Corporation. Drain cleaner. 4,587,032, Cl. 252-174.170.

Rohde, Robert S.: *See—*
Chandra, Suresh; and Rohde, Robert S., 4,586,821, Cl. 356-363.000.

Rohm, Gunter H. Autolocking hammer-drill chuck. 4,586,859, Cl. 408-240.000.

Rohrback Corporation: *See—*
Rhoades, Rex V.; and Finley, Charles M., 4,587,479, Cl. 324-65.0CR.

Rollen, Donald C.: *See—*
Barrell, David; Kennedy, Donald E.; and Rollen, Donald C., 4,587,161, Cl. 428-288.000.

Rolls-Royce Limited: *See—*
Carlin, Robert N., 4,586,329, Cl. 60-226.200.

Rolsten, Gina K.: *See—*
Hotchkiss, Harry W.; Fields, Robert D.; and Rolsten, Gina K., 4,587,154, Cl. 428-195.000.

Romberg, Hendrik, to U.S. Philips Corporation. Method of manufacturing hollow glass objects, and apparatus for carrying out the method. 4,586,944, Cl. 65-79.000.

Rosato, Charles. Inboard/outboard motor bell housing cover. 4,586,909, Cl. 440-112.000.

Rosenkranz, Roberto P.: *See—*
Goodman, Murray; Castagnoli, Neal; Jacobson, Kenneth; Melmon, Kenneth L.; Rosenkranz, Roberto P.; and Verlander, Michael S., 4,587,046, Cl. 530-330.000.

Rosenquist, Niles R., to General Electric Company. Polycarbonate from nonaromatic cyclic anhydride having improved optical properties. 4,587,326, Cl. 528-176.000.

Rosin, Donald A.: *See—*
Field, Martin J.; and Rosin, Donald A., 4,586,477, Cl. 123-468.000.

Roth, Barbara; and Rauckman, Barbara S., to Burroughs Wellcome Co. 2,4-diamino-5-(1,2,3,4-tetrahydro-(substituted or unsubstituted)-6-quinolylmethyl)pyrimidines, useful as antimicrobials. 4,587,341, Cl. 544-324.000.

Rothe, Anselm; Selle, Adolf K.; and Sojka, Bernward, to Boehringer Mannheim GmbH. Test strips for the detection of a liquid sample component. 4,587,099, Cl. 422-56.000.

Rothe, Herbert: *See—*
Weber, Ralph; and Rothe, Herbert, 4,586,897, Cl. 432-121.000.

Rottmayr, Josef: *See—*
Fiergolla, Ulrich; and Rottmayr, Josef, 4,586,307, Cl. 52-334.000.

Rowenta-Werke, GmbH: *See—*
Reiss, Gerald; and Henneberger, Gerd, 4,586,277, Cl. 38-77.810.

Roy, Rustum; and Alamo, Jaime, to Perkin-Elmer Corporation, The. Mirror substrate of atomically substituted Na Zr_2PO_{12} low expansion ceramic material. 4,587,172, Cl. 428-450.000.

Rubin, Martin D., to Laser Industries Ltd. Control apparatus particularly useful for controlling a laser. 4,587,396, Cl. 219-121.0LU.

Rudnick, Leslie R., to Mobil Oil Corporation. Process for visbreaking resids in the presence of hydrogen-donor materials and organic sulfur compounds. 4,587,007, Cl. 208-107.000.

Ruff, Stanley L.; and Stubbmann, Albert, to Clik-Cut, Inc. Sheet material dispenser and method of dispensing sheet material. 4,586,639, Cl. 225-1.000.

Russo, Michael A.: *See—*
Davenport, John; and Russo, Michael A., 4,587,458, Cl. 315-111.010.

Rutgerswerke Aktiengesellschaft: *See—*
Gardziella, Arno; Schwieger, Karl-Heinz; Adolphs, Peter; and Grossmann, Gerhard, 4,587,291, Cl. 524-595.000.

Ryan, Charles W., to Eli Lilly and Company. Isothiourea synthesis process. 4,587,344, Cl. 548-205.000.
Sabre Safety Limited: *See*—
Glynn, Michael H., 4,586,500, Cl. 128-204.150.
Sacco, Anthony R.: *See*—
Carlson, Richard C.; DeRespiris, Donald L.; Sacco, Anthony R.; Groszek, Donald J.; and Ivancic, Bonnie M., 4,586,562, Cl. 165-134.100.
Sagiv, Efraim: *See*—
Borase, Vijay; Smith, James F.; and Sagiv, Efraim, 4,587,068, Cl. 264-63.000.
Sahni, Atam P.: *See*—
Williams, Charles F.; and Sahni, Atam P., 4,587,160, Cl. 428-288.000.
Saiji, Mitsuhiro: *See*—
Hashimoto, Shintaro; and Saiji, Mitsuhiro, 4,587,635, Cl. 364-900.000.
St-Hilaire, Normand. Porthole assembly for a swimming-pool wall. 4,587,599, Cl. 362-101.000.
St. Louis, Robert M., to Camco Inc. Drier bearing. 4,586,269, Cl. 34-133.000.
St. Louis University: *See*—
Greenberg, Richard N., 4,587,265, Cl. 514-562.000.
St-Pierre, Guy. Gravity cooling coil device. 4,586,346, Cl. 62-259.100.
Saito, Akio; Aoki, Seiichi; Inamoto, Tadayoshi; Yokoi, Katsuyuki; and Ikeda, Masami, to Canon Kabushiki Kaisha. Liquid injection recording apparatus. 4,587,534, Cl. 346-140.00R.
Saito, Hiroyuki; and Ueda, Takeo, to NSK-Warner K.K. Automatic locking retractor. 4,586,678, Cl. 242-107.40D.
Saito, Jun; and Takahashi, Yuji, to Canon Kabushiki Kaisha. Image recording apparatus with color detection. 4,587,536, Cl. 346-160.000.
Saito, Junichi: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Shiokawa, Kozo; Morishima, Norihisa; and Goto, Toshio, 4,586,951, Cl. 71-92.000.
Saito, Shinzo: *See*—
Sasaki, Kazuo; Nishiguchi, Yoichi; and Saito, Shinzo, 4,586,650, Cl. 229-137.000.
Saito, Yukio: *See*—
Shimaoka, Motohiro; and Saito, Yukio, 4,587,585, Cl. 360-97.000.
Saitoh, Haruhisa: *See*—
Shimizu, Hideaki; Kofune, Eiichi; Saitoh, Haruhisa; and Kobayashi, Katsuya, 4,587,022, Cl. 210-710.000.
Saitoh, Keishi; Ohnuki, Yukihiko; and Ohno, Shigeru, to Canon Kabushiki Kaisha. Photoconductive member comprising amorphous silicon-germanium and nitrogen. 4,587,190, Cl. 430-85.000.
Saitoh, Yuichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Cassette type semiconductor memory device. 4,587,640, Cl. 365-229.000.
Sakaguchi, Yukihiko; Aono, Toshiaki; and Fujita, Shinsaku, to Fuji Photo Film Co., Ltd. Method for forming images. 4,587,206, Cl. 430-348.000.
Sakai, Shinji: *See*—
Tsunekawa, Tokuichi; Sakai, Shinji; and Kinoshita, Takao, 4,587,415, Cl. 250-204.000.
Sakakiyama, Ryuzo: *See*—
Yamakawa, Toru; Makita, Fujio; Umezawa, Mitsuo; and Sakakiyama, Ryuzo, 4,586,583, Cl. 180-247.000.
Sakata, Kei: *See*—
Obara, Takashi; Osawa, Kazunori; Nishida, Minoru; Sakata, Kei; and Kuguminato, Hideo, 4,586,965, Cl. 148-12.00D.
Sakata, Noboru: *See*—
Kishimoto, Munehisa; Sakata, Noboru; Kimura, Miyoshi; Fujiwara, Kouichi; and Komura, Hidekazu, 4,586,789, Cl. 350-336.000.
Sakuma, Nobuo; and Kaneko, Yutaka. Laser beam optical system with inclined cylindrical lens. 4,586,782, Cl. 350-6.500.
Sakurai, Takayasu: *See*—
Isobe, Mitsuo; Sakurai, Takayasu; Sawada, Kazuhiro; Iizuka, Tetsuya; Ohtani, Takayuki; and Aono, Akira, 4,587,638, Cl. 365-200.000.
Sakurai, Yoshihiko, to Diesel Kiki Co., Ltd. Air conditioner system for automobiles. 4,586,652, Cl. 236-13.000.
Salas, Edward R.: *See*—
Boudreau, Daniel A.; Sandini, James M.; and Salas, Edward R., 4,587,609, Cl. 364-200.000.
Salyer, Ival O.; and Griffen, Charles W., to University of Dayton. Cementitious building material incorporating end-capped polyethylene glycol as a phase change material. 4,587,279, Cl. 523-206.000.
Samejima, Yasushi; Shiga, Minoru; Kano, Toshiji; Yamada, Kiyoshi; and Nishio, Tsutomu, deceased (by Nishio, Haruko, legal representative), to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Electrolytic process of an aqueous alkali metal halide solution and electrolytic cell used therefor. 4,586,994, Cl. 204-98.000.
Sanada, Masashi, to Kabushiki Kaisha Toshiba. High voltage transformer and rectifier arrangement. 4,587,606, Cl. 363-68.000.
Sanden Corporation: *See*—
Hiraga, Masaharu; and Daikohara, Tamotsu, 4,586,874, Cl. 417-222.000.
Sandini, James M.: *See*—
Boudreau, Daniel A.; Sandini, James M.; and Salas, Edward R., 4,587,609, Cl. 364-200.000.
Sandoz Ltd.: *See*—
Doswald, Paul; Moriconi, Emil; Moser, Helmut; and Schmid, Horst, 4,587,292, Cl. 534-606.000.
Sankyo Manufacturing Company, Ltd.: *See*—
Kato, Heizaburo, 4,586,259, Cl. 33-1.0PT.
Sano, Shigenori, to Casio Computer Co., Ltd. Rhythm generating apparatus of an electronic musical instrument. 4,586,416, Cl. 84-1.030.
Sanofi: *See*—
Demarne, Henri; and Hallot, Andre , 4,587,245, Cl. 514-221.000.
Sanyei Corporation: *See*—
Ozaki, Osamu, 4,587,450, Cl. 310-156.000.
Sanyo Electric Co., Ltd.: *See*—
Hara, Mitsunori; Yoshihira, Yukiteru; and Furuhashi, Toshiro, 4,587,180, Cl. 429-8.000.
Kosaka, Haruhisa; and Takaoka, Daizo, 4,587,376, Cl. 136-248.000.
Nakayama, Kiyoshi; Kato, Takashi; Sekiguchi, Tatsuo; Satoh, Mamoru; and Hayakawa, Koshiro, 4,586,348, Cl. 62-277.000.
Tanaka, Kanji; and Ishiguro, Kazuhisa, 4,587,500, Cl. 333-213.000.
Tutino, Kunio, 4,587,584, Cl. 360-96.300.
Sanyo-Kokusaku Pulp Co., Ltd.: *See*—
Masaoka, Yoshiji; and Kubo, Motonobu, 4,587,352, Cl. 549-335.000.
Saran Protective Coating Company: *See*—
Smith, Noel A.; and Avallone, William J., 4,586,963, Cl. 148-6.15R.
Sargent, Ronald S.; and Morris, Bryan J., to Massey-Ferguson Services N.V. Hitch assembly. 4,586,724, Cl. 280-412.000.
Sarofeen, Joseph J.: *See*—
Longacre, Andrew, Jr.; and Sarofeen, Joseph J., 4,587,559, Cl. 358-160.000.
Sartor, Bruno; Huftle, Jurgen; Strasmann, Burkhart; and Fischer, Franz-Josef, to Uranit GmbH. Guide roller for paper and foil handling apparatus such as printing presses. 4,586,224, Cl. 29-121.200.
Sarugaku, Shinichi; and Tsuji, Masao, to Hitachi Ltd.; and Hitachi Keiyo Engineering Co., Ltd. Weld line system and method for control. 4,587,398, Cl. 219-124.220.
Sasaki, Kazuo; Nishiguchi, Yoichi; and Saito, Shinzo, to JuJo Paper Co., Ltd. Blank structure with indented fold lines for a cardboard container. 4,586,650, Cl. 229-137.000.
Sasaki, Ken: *See*—
Umeda, Takao; Miyashita, Takao; Shimazaki, Yuzuru; Igawa, Tatsuo; Sasaki, Ken; and Matsuyama, Shigeru, 4,586,790, Cl. 350-337.000.
Sasaki, Tetsuo: *See*—
Otake, Noboru; Seto, Haruo; Sasaki, Tetsuo; Sugita, Masanori; and Hiramoto, Shigeru, 4,587,237, Cl. 514-183.000.
Sasaki, Yutaka; Nakamura, Toshio; Yamamoto, Hiroshi; Murata, Hiroshi; Nakamura, Yoshimi; and Takahashi, Naohiro, to Niito Chemical Industry Co., Ltd. Process for producing antimony-containing oxide catalyst with improved strength. 4,587,226, Cl. 502-5.000.
Sassy, Inc.: *See*—
Day, Diane I.; and Schuiling, Raymond R., 4,586,746, Cl. 297-174.000.
Sata, Toshikatsu: *See*—
Nakahara, Akihiko; Sata, Toshikatsu; Shirouzu, Masaki; and Kunai, Kenji, 4,587,274, Cl. 522-126.000.
Sato, Hideo: *See*—
Sugiyama, Hiroyuki; Takahashi, Nobuaki; Shibamoto, Takeshi; Sato, Hideo; Amano, Yoshiaki; and Tanaka, Koji, 4,587,558, Cl. 358-160.000.
Sato, Masatomo: *See*—
Nakano, Kouichi; Maruyama, Seiichi; Nakano, Seizo; and Sato, Masatomo, 4,587,592, Cl. 361-127.000.
Sato, Shiniti: *See*—
Takago, Toshio; Inoue, Yoshio; Terashima, Masami; and Sato, Shiniti, 4,587,354, Cl. 556-417.000.
Sato, Shinobu, to Unno, Yukiyasu. Radiation shield. 4,587,277, Cl. 523-136.000.
Sato, Tsuguo: *See*—
Odagiri, Yoichi; and Sato, Tsuguo, 4,587,575, Cl. 360-15.000.
Satoh, Hiroshi: *See*—
Ohtsuka, Katsuyuki; Mizuno, Ryukichi; Miyazaki, Hitoshi; Fukuzuka, Toshio; Shimogori, Kazutoshi; Satoh, Hiroshi; and Kami Kubo, Fumio, 4,587,098, Cl. 422-7.000.
Satoh, Jinichi; Ino, Hideya; Ishikawa, Masaaki; and Iguchi, Michihisa, to Tokyo Shibaura Denki Kabushiki Kaisha; and International Business Machines Corp. Automatic paper feeding device for a facsimile equipment or the like apparatus. 4,586,705, Cl. 271-122.000.
Satoh, Mamoru: *See*—
Nakayama, Kiyoshi; Kato, Takashi; Sekiguchi, Tatsuo; Satoh, Mamoru; and Hayakawa, Koshiro, 4,586,348, Cl. 62-277.000.
Satzinger, Gerhard; Hartenstein, Johannes; Fritschi, Edgar; and Vögelius, Wolf-Dieter, to Warner-Lambert Company. Cycloaliphatic aminosulfonic acid derivatives. 4,587,263, Cl. 514-553.000.
Saunders, Jimmy G., to Charlton Associates. Method of finishing the surface of a disc. 4,586,296, Cl. 51-281.0SF.
Saurer Diederichs (Societe Anonyme): *See*—
Volland, Michel; Fourneaux, Roger; and Remond, Pierre, 4,586,543, Cl. 139-452.000.
Savelli, Francis, to Ducellier & Cie. Rotor for a small electric motor having reduced shaft portion to improve windings. 4,587,451, Cl. 310-208.000.
Savin Corporation: *See*—
Landa, Benzion, 4,586,810, Cl. 355-12.000.
Sawada, Kazuhiro: *See*—
Isobe, Mitsuo; Sakurai, Takayasu; Sawada, Kazuhiro; Iizuka, Tetsuya; Ohtani, Takayuki; and Aono, Akira, 4,587,638, Cl. 365-200.000.
Sawada, Tetsuya: *See*—
Tokuno, Masateru; Sawada, Tetsuya; Hoshiyama, Hidetoshi; and Yoneda, Toshihiro, 4,586,434, Cl. 101-178.000.
Tokuno, Masateru; Sawada, Tetsuya; and Ishii, Yoshihiro, 4,586,673, Cl. 242-58.600.

Sawai, Hideo: *See—*
Kanamori, Takashi; Shibata, Susumu; Sawai, Hideo: and Kuroki, Kenji, 4,587,400, Cl. 219-216.000.
Sawamura, Keiichi; Eto, Yoshiyuki; Mine, Junichi; and Masuda, Koji, to Nissan Motor Co., Ltd. Method of producing monolithic catalyst for purification of exhaust gas. 4,587,231, Cl. 502-304.000.
Sawicki, Frank S.; Mital, Mark D.; and Osborne, Francis J., to RCA Corporation. Dual control burner manifold for CRT production. 4,586,945, Cl. 65-138.000.
SaynjaKangas, Seppo. Procedure and means for wireless measurement of the speed of small craft such as a surfboard or a boat. 4,586,374, Cl. 73-187.000.
Scales, John T., to National Research Development Corp. Endoprosthetic bone devices. 4,586,932, Cl. 623-16.000.
Scalzo, Arthur C., to Specialized Printed Forms, Inc. Business mailer. 4,586,611, Cl. 206-610.000.
Scans Associates, Inc.: *See—*
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.
Schafer, Heinrich, to Battenfeld Extrusionstechnik GmbH. Drive for two-worm extruder. 4,586,402, Cl. 74-801.000.
Schaffer, Hans-Georg; Vogts, Axel; Poppel, Gunter; and Schurmann, Horst, to Akzo N.V. Fuel briquets. 4,586,936, Cl. 44-10.00C.
Schaich, Wilbur A.: *See—*
Dibrell, Edwin W.; O'Neal, Glenn B.; and Schaich, Wilbur A., 4,586,426, Cl. 91-176.000.
Schammel, Wayne P.: *See—*
Kilner, Peter H.; Egan, Joseph P., Jr.; Ceisel, Stephen G.; and Schammel, Wayne P., 4,587,350, Cl. 549-245.000.
Schas, Marc L.; and Taylor, Steven C., to Verilink Corporation. Interface method and apparatus. 4,587,514, Cl. 340-347.0DD.
Schausberger, Helmut: *See—*
Becherer, Walter; Geyken, Erwin; Jelinek, Nikolaus; Lechner, Franz; and Schausberger, Helmut, 4,586,311, Cl. 53-381.00R.
Schering Aktiengesellschaft: *See—*
Annen, Klaus; Petzoldt, Karl; Laurent, Henry; Wiechert, Rudolf; and Hofmeister, Helmut, 4,587,236, Cl. 514-179.000.
Bittler, Dieter; Laurent, Henry; Nickisch, Klaus; and Wiechert, Rudolf, 4,587,235, Cl. 514-178.000.
Schering Corporation: *See—*
Girijavallabhan, Viyyoor M.; Ganguly, Ashit K.; and Versace, Richard W., 4,587,241, Cl. 514-192.000.
Gold, Elijah H.; Neustadt, Bernard R.; and Smith, Elizabeth M., 4,587,258, Cl. 514-412.000.
Schexnayder, Lawrence F., to Caterpillar Tractor Co. Hydraulic swing motor control circuit. 4,586,332, Cl. 60-468.000.
Schiehser, Guy A.; and Strike, Donald P., to American Home Products Corporation. Process for preparing thieno-fused heterocyclic antiulcer agents. 4,587,345, Cl. 548-212.000.
Schiff, Leonard N., to RCA Corporation. Apparatus for synchronizing spread spectrum transmissions from small earth stations used for satellite transmission. 4,587,661, Cl. 375-1.000.
Schilder, Wolfgang: *See—*
Dotzauer, Bernhard; Kast, Hans; Franzmann, Gernot; Ley, Gregor; Beckerle, Wilhelm F.; and Schilder, Wolfgang, 4,587,278, Cl. 523-200.000.
Schinzel, Erich; and Pelster, Manfred, to Hoechst Aktiengesellschaft. Perfluoroalkyl esters of anthranilic acids. 4,587,338, Cl. 544-197.000.
Schlag, Johannes: *See—*
Munstedt, Helmut; Gebhard, Helmut; Naarmann, Herbert; and Schlag, Johannes, 4,587,037, Cl. 252-500.000.
Schlager, Kenneth J.; and Melvin, Jeffrey R., to Biotronics Instruments. Phonoangiographic spectral analysing apparatus. 4,586,514, Cl. 128-773.000.
Schlichthorst, Norbert, to Blohm & Voss AG. Exhaust gas system for the internal combustion engines of a ship. 4,586,908, Cl. 440-89.000.
Schlumberger Technology Corporation: *See—*
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Schorr, Ian A., to Rockwell International Corporation. Coupling-/decoupling capacitor multiplier. 4,587,437, Cl. 307-109.000.
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Shanton, Kenneth J.; and Azizian, Farid, to Wiggins Teape Group Limited, The. Record material. 4,587,538, Cl. 346-218.000.
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Smith, Frank. Clothes hanger handle for umbrellas. 4,586,524, Cl. 135-16.000.
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Smith, James F.: *See—*
Borase, Vijay; Smith, James F.; and Sagiv, Efraim, 4,587,068, Cl. 264-63.000.
Smith, James P., to Hanscom, H. F. Method and apparatus of forming cords of hanking. 4,586,669, Cl. 242-53.000.
Smith, Marvin M. Electrical thermal storage heat sink for space heater. 4,587,404, Cl. 219-378.000.
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Smith, Paul D., to Lowe & Fletcher Ltd. Mounting a device on a member. 4,586,354, Cl. 70-451.000.
Smith, Paul D.; and Hsieh, Eric T., to Phillips Petroleum Company. Ethylene polymers and chromium catalysts. 4,587,227, Cl. 502-153.000.
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Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.
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Smith, Ronald T.: *See—*
Chern, Mao-Jin; Gunther, John E.; and Smith, Ronald T., 4,586,780, Cl. 350-3.700.
Gunther, John E.; and Smith, Ronald T., 4,586,781, Cl. 350-3.700.
Smith, Steven A.: *See—*
Edwards, Alan T.; and Smith, Steven A., 4,586,743, Cl. 294-86.400.
Smithers-Oasis Company: *See—*
Walton, Charles F., 4,586,288, Cl. 47-73.000.
SmithKline Beckman Corporation: *See—*
Chow, Alfred W.; and Theodorides, Vassilios J., 4,587,361, Cl. 564-179.000.
Huffman, William F.; and Moore, Michael L., 4,587,045, Cl. 530-328.000.
Smock, Alan L.: *See—*
Gresley, Ross A.; Leech, Howard E.; and Smock, Alan L., 4,586,245, Cl. 29-602.00R.
Smutek, John M.: *See—*
Wang, An; Fry, Stanley B.; Ho, Shu K.; and Smutek, John M., 4,587,633, Cl. 364-900.000.
Snetting, Mark E.: *See—*
Bricher, Charles W.; and Snetting, Mark E., 4,586,213, Cl. 15-320.000.
Sniezak, Gary, to Bangor Punta Corporation. Grip assembly for a handgun. 4,586,282, Cl. 42-71.00P.
Snyder General Corporation: *See—*
Shapess, Robert P., 4,587,403, Cl. 219-366.000.
Societe Anonyme: Leisystem: *See—*
Bernard, Bernard, 4,586,450, Cl. 114-108.000.
Societe des Transport Petroliers par Pipe-Line: *See—*
Mocquart, Jacques M.; and Dang, Alain Y., 4,586,529, Cl. 137-268.000.
Societe Europeenne de Propulsion: *See—*
Toutin, Paul, 4,586,420, Cl. 89-1.702.
Societe Francaise Hoechst: *See—*
Rivoallon, Jean, 4,586,959, Cl. 106-84.000.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A.: *See—*
Bouiller, Jean G.; and Delonge, Jean-Claude L., 4,586,225, Cl. 29-156.80R.
Societe Nationale Elf Aquitaine: *See—*
Bauer, Denise; Komornicki, Jacques; and Tellier, Jacques, 4,587,106, Cl. 423-8.000.
Vio, Lino; and Meunier, Gilles, 4,587,306, Cl. 525-354.000.
Societe Nationale Elf Aquitaine (Production): *See—*
Sturtz, Georges; Pensec, Thierry; and Gautier, Jean-Claude, 4,587,034, Cl. 252-184.000.
Sogo, Toshiyuki: *See—*
Tanimoto, Yasufumi; Watanabe, Junji; and Sogo, Toshiyuki, 4,586,808, Cl. 355-8.000.
Soini, Erkki; Hemmila , Ilkka; and Lovgren, Timo, to Wallac Oy. Method for quantitative determination of a biospecific affinity reaction. 4,587,223, Cl. 436-536.000.

Sojka, Bernward: *See*—
Rothe, Anselm; Selle, Adolf K.; and Sojka, Bernward, 4,587,099, Cl. 422-56.000.
Solid Controls, Inc.: *See*—
Duncan, Kenneth R., 4,587,613, Cl. 364-200.000.
Somerville, Michael J.; Pollard, Ian F.; and Walker, William J. Control apparatus. 4,586,893, Cl. 431-76.000.
Sondhi, Man M.: *See*—
Levinson, Stephen E.; Rabiner, Lawrence R.; and Sondhi, Man M., 4,587,670, Cl. 381-43.000.
Sony Corporation: *See*—
Collins, Mark C., 4,587,556, Cl. 358-140.000.
Fujiie, Kazuhiko, 4,587,644, Cl. 369-44.000.
Monen, Marinus J. B. M.; Furukawa, Shunsuke; and Furuya, Tsuneo, 4,587,643, Cl. 369-32.000.
Nakane, Yasuaki; Kitagawa, Masataka; Kiyomiya, Tadashi; and Yanada, Tetsunosuke, 4,587,533, Cl. 346-135.100.
Odagiri, Yoichi; and Sato, Tsuguo, 4,587,575, Cl. 360-15.000.
Odaka, Kentaro, 4,587,573, Cl. 360-10.300.
Tamura, Takahiko; and Tokuhara, Masaharu, 4,587,554, Cl. 358-74.000.
Uedaira, Satoru; Yamanoi, Hiroshi; and Tamura, Hidemasa, 4,587,041, Cl. 252-572.000.
Watanabe, Toshiro; and Ohkoshi, Akio, 4,587,553, Cl. 358-64.000.
Yamamori, Eiji; and Suzuki, Hiroyuki, 4,587,567, Cl. 358-248.000.
Sooy, Robert J.: *See*—
Bandura, Vitaly; and Sooy, Robert J., 4,586,237, Cl. 29-566.300.
Souchi, Toshiyuki; Fujiyama, Hisanori; and Hagi, Mitsuo, to Toyoda Gosei Co., Ltd. Apparatus for conveying elongated objects. 4,586,253, Cl. 29-796.000.
Southco, Inc.: *See*—
Dougherty, Robert W., 4,586,736, Cl. 292-202.000.
Soyck, Gerno, to Werner Turck GmbH & Co., KG. Switch for detecting a magnetic field. 4,587,486, Cl. 324-236.000.
Spafax Holdings, plc: *See*—
Norman, Timothy H., 4,586,618, Cl. 211-133.000.
Spani, Wayne M.: *See*—
Roes, John B.; Winkles, Billy B.; Kelly, Guy M.; Spani, Wayne M.; and Schuster, Donald W., 4,587,434, Cl. 250-556.000.
Special Equipment Companies, Inc., Taylor Freezer Division: *See*—
Adamson, Lee E., 4,586,428, Cl. 99-332.000.
Specialized Printed Forms, Inc.: *See*—
Scalzo, Arthur C., 4,586,611, Cl. 206-610.000.
Spector, George: *See*—
Hedquist, Ace H.; and Spector, George, 4,586,454, Cl. 116-28.00R.
Speicher, John M.: *See*—
Redman, Paul G.; and Speicher, John M., 4,586,425, Cl. 91-45.000.
Speisebecher, Joachim: *See*—
Bauer, Herbert; Waibel, Hans; and Speisebecher, Joachim, 4,586,636, Cl. 222-146.500.
Sperry Corporation: *See*—
Cosimini, Gregory J.; Lo, David S.; and Zierhut, Lawrence G., 4,587,636, Cl. 365-87.000.
Spielmann, Norbert; Gussbacher, Udo; Walther, Wolfgang; and Bauer, Hermann, to Fag Kugelfischer Georg Schafer & Co. Mounting for power-assisted master brake cylinder in an automotive vehicle. 4,586,580, Cl. 180-89.100.
Spielvogel, Bernard F.; McPhail, Andrew T.; and Hall, Iris H., to United States of America, Army. Amine-carbamoylborane adducts. 4,587,359, Cl. 564-8.000.
Spiralux Limited: *See*—
Quitmann, Clive E. O., 4,586,615, Cl. 211-70.600.
Sprecher & Schuh AG: *See*—
Suter, Heinz, 4,587,503, Cl. 335-135.000.
Srivatsa, Sanjay R.; Wetegrove, Robert L.; and Patzelt, Robert R., to Nalco Chemical Company. Control system for a process. 4,587,023, Cl. 210-744.000.
Staffa, Karl-Heinz: *See*—
Kern, Josef; Bardong, Helmut; Humpolik, Bohumil; and Staffa, Karl-Heinz, 4,586,566, Cl. 165-173.000.
Stafford, Raymond, to Dobson Park Industries Plc. Connection devices. 4,586,867, Cl. 414-723.000.
Stahlhammer, Mischa. Adjustable end pin for the cello. 4,586,418, Cl. 84-280.000.
Staines, Glyn: *See*—
Butcher, Peter E.; Dick, David A.; Nicholas, James W.; Robinson, Melvin E. R.; and Staines, Glyn, 4,587,075, Cl. 264-573.000.
Standard Oil Company, The: *See*—
Li, George S., 4,586,939, Cl. 55-16.000.
Standard Telephones and Cables, PLC: *See*—
Drake, Cyril F.; and Arch, Alfred J., 4,587,267, Cl. 514-769.000.
Pitt, Gillies D.; and Extance, Philip, 4,587,509, Cl. 338-32.00H.
Stanley Works, The: *See*—
Weimann, George F., 4,586,256, Cl. 30-162.000.
Stanton, Raymond J., to RayGo, Inc. Vibratory mechanism. 4,586,847, Cl. 404-117.000.
Staples, James F., to Digital Equipment Corporation. Heat sink arrangement with clip-on portion. 4,587,595, Cl. 361-388.000.
Stauber, Niklaus, to CPC International Inc. Storable product which can be whipped up to a dessert mousse, and a process for its preparation. 4,587,130, Cl. 426-564.000.
Stauffacher, Werner, to Werkzeugmaschinenfabrik, Oerlikon-Buhrle AG. Cartridge belt and belt links therefor. 4,586,423, Cl. 89-35.020.
Stauffer Chemical Company: *See*—
Honig, Milton L.; and Weil, Edward D., 4,587,362, Cl. 564-013.000.
Michaely, William J.; and Curtis, Jeff K., 4,586,954, Cl. 71-94.000.
Stauffer, Werner: *See*—
Schmid, Rolf; Zondler, Helmut; Fischer, Michael; and Stauffer, Werner, 4,587,311, Cl. 525-504.000.
STE LOOK: *See*—
Andrieu, Louis; and Peyre, Henri, 4,586,727, Cl. 280-607.000.
Stearns Catalytic World Corporation: *See*—
O'Brien, Thomas F., 4,586,993, Cl. 204-98.000.
Stehr, Robert L.: *See*—
Denney, James R.; and Stehr, Robert L., 4,586,436, Cl. 102-206.000.
Steiner, Alois, to Sulzer-Ruti Machinery Work Ltd. Weaving rotor. 4,586,541, Cl. 139-435.000.
Steinmetz, Gunter; and Bohn, Gerhard, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Apparatus for controlling a magnet in a magnetically suspended vehicle having a linear stator. 4,587,472, Cl. 318-687.000.
Stenzenberger, Horst, to Boots Company PLC, The. Modified thermosetting imide resins with improved fracture toughness. 4,587,281, Cl. 523-500.000.
Stephens, James B., to Coast Foundry & Manufacturing Company. Flushometer valve integrable with a structure. 4,586,692, Cl. 251-15.000.
Stephenson, Edward J.; and Kannan, Raghavachari, to Crane Co. Sealing assembly with floating gland means for rotatable shafts. 4,586,718, Cl. 277-22.000.
Stevens, John E., to Leggett & Platt, Incorporated. Sofa-sleeper having a removable sofa bed mechanism. 4,586,205, Cl. 5-13.000.
Stewart, Gene A.: *See*—
Mankins, William L.; Curtis, Lindy J.; and Stewart, Gene A., 4,587,096, Cl. 419-27.000.
Stewart, William J., to Plessey Overseas Limited. Optical fibre spot size determination apparatus. 4,586,816, Cl. 356-73.100.
Stiles, James A. R.; Brandt, Klaus; Wainwright, David S.; and Lee, Keith C., to Moli Energy Limited. Constant volume lithium battery cell and process. 4,587,182, Cl. 429-94.000.
Stiller, Alfred H.: *See*—
Stiller, David W.; and Stiller, Alfred H., 4,586,660, Cl. 241-24.000.
Stiller, David W.; and Stiller, Alfred H. Process for separating anthracite coal from impurities. 4,586,660, Cl. 241-24.000.
Stillhard, Otmar: *See*—
Lerch, Hansueli; and Stillhard, Otmar, 4,586,448, Cl. 112-275.000.
Stocker, Manfred: *See*—
Schondorfer, Georg; Fleischer, Johann; Stocker, Manfred; and Korber, Gunther, 4,586,823, Cl. 366-3.000.
Stockham, Michael A.: *See*—
Hider, Robert C.; Kontoghiorghes, George; Silver, Jack; and Stockham, Michael A., 4,587,240, Cl. 514-188.000.
Stockham, Norman R.: *See*—
Oakley, Peter J.; Stockham, Norman R.; and Miller, Heidi M., 4,587,395, Cl. 219-121.0LD.
Stockton, Thomas W.: *See*—
Auman, John T.; Luyckx, Robert R.; Singh, Harmahendar; and Stockton, Thomas W., 4,586,584, Cl. 180-271.000.
Stoessel, Armin: *See*—
Hartig, Jurgen; Schuch, Gunter; Stoessel, Armin; Herrmann, Guenter; Brunner, Arthur; Zehner, Peter; and Grosskinsky, Otto-Alfred, 4,587,363, Cl. 568-357.000.
Stoldt, Erwin F., to Marathon LeTourneau Company. Electrically powered mobile apparatus and method with suspended power cable. 4,587,383, Cl. 191-12.00R.
Stoll, Kurt. Solenoid valve unit. 4,586,535, Cl. 137-596.170.
Stollbrink, Johann: *See*—
Corzilius, Rolf; Noack, Horst-Guenter; and Stollbrink, Johann, 4,586,872, Cl. 415-219.00C.
Stopinc Aktiengesellschaft: *See*—
Bachmann, Herbert; and Schwyter, Anton, 4,586,699, Cl. 266-287.000.
Storage Technology Partners: *See*—
Zasio, John J., 4,587,480, Cl. 324-73.00R.
Stow & Davis Furniture Company: *See*—
Dingler, Douglas W.; Gadsbey, James F.; and Crossman, Philip E., 4,586,748, Cl. 297-300.000.
Strasmann, Burkhart: *See*—
Sartor, Bruno; Huftle, Jurgen; Strasmann, Burkhart; and Fischer, Franz-Josef, 4,586,224, Cl. 29-121.200.
Straton, Peter R.; and McClelland, Scott R., to Hewlett-Packard Company. Intelligent programmable touchscreen system. 4,587,630, Cl. 364-900.000.
Straub, Peter: *See*—
Tank, Eggert; and Straub, Peter, 4,586,554, Cl. 164-97.000.
Strayer, Jonathan R.: *See*—
Glaser, Roger M.; Glaser, Marcus; Collins, Steven R.; and Strayer, Jonathan R., 4,586,510, Cl. 128-423.00W.
Strike, Donald P.: *See*—
Schiehser, Guy A.; and Strike, Donald P., 4,587,345, Cl. 548-212.000.
Stry-Lenkoff Co.: *See*—
Lenkoff, Leon G.; Lenkoff, Roger J.; and Garry, Patrick J., 4,586,714, Cl. 273-157.00R.
Stubbmann, Albert: *See*—
Ruff, Stanley L.; and Stubbmann, Albert, 4,586,639, Cl. 225-1.000.
Stubenvoll, Josef, to Simmering-Graz-Pauker Aktiengesellschaft. Process and apparatus for a recovery of heat comprising a heat-recovering absorption of water vapor from gases. 4,586,940, Cl. 55-32.000.
Stubican, Vladimir S.: *See*—
Agrawal, Dinesh K.; Stubican, Vladimir S.; and Mehrotra, Yogesh, 4,587,067, Cl. 264-63.000.

Stultz, Peter F.: *See*—
Liautaud, James P.; Stultz, Peter F.; and Maloney, David L., 4,587,593, Cl. 361-383.000.
Sturtz, Georges; Pensec, Thierry; and Gautier, Jean-Claude, to Societe Nationale Elf Aquitaine (Production). Triphosphonic esters. 4,587,034, Cl. 252-184.000.
Sudholter, Ernst J. R.: *See*—
Minderhoud, Johannes K.; Post, Martin F. M.; Sie, Swan T.; and Sudholter, Ernst J. R., 4,587,008, Cl. 208-109.000.
Sudo, Yoshimi: *See*—
Kuwabara, Hideki; and Sudo, Yoshimi, 4,587,270, Cl. 521-58.000.
Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. KG: *See*—
Kern, Josef; Bardong, Helmut; Humpolik, Bohumil; and Staffa, Karl-Heinz, 4,586,566, Cl. 165-173.000.
Suga, Yukio: *See*—
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, 4,587,568, Cl. 358-293.000.
Sugawara, Katuo: *See*—
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, 4,587,162, Cl. 428-290.000.
Sugeta, Takayuki: *See*—
Amemiya, Yoshihito; Sugeta, Takayuki; and Mizushima, Yoshihiko, 4,587,547, Cl. 357-59.000.
Sugita, Masanori: *See*—
Otake, Noboru; Seto, Haruo; Sasaki, Tetsuo; Sugita, Masanori; and Hiramoto, Shigeru, 4,587,237, Cl. 514-183.000.
Sugiyama, Hiroyuki; Takahashi, Nobuaki; Shibamoto, Takeshi; Sato, Hideo; Amano, Yoshiaki; and Tanaka, Koji, to Victor Company of Japan, Ltd. Address signal generating circuit for a memory circuit. 4,587,558, Cl. 358-160.000.
Sulzer Brothers Limited: *See*—
Demuth, Hans, 4,586,542, Cl. 139-439.000.
Wynn, Nicholas P., 4,587,111, Cl. 423-112.000.
Sulzer-Ruti Machinery Work Ltd.: *See*—
Steiner, Alois, 4,586,541, Cl. 139-435.000.
Sumitomo Electric Industries, Ltd.: *See*—
Ishise, Kojiro; and Kojima, Keiichi, 4,586,970, Cl. 156-48.000.
Kyoto, Michihisa; Yoshioka, Naoki; Tanaka, Gotaro; Watanabe, Minoru; Shimba, Hiroshi; and Inagaki, Nobuo, 4,586,943, Cl. 65-3.120.
Ono, Kimizo; Takenaka, Shinya; and Sunago, Katsuyoshi, 4,586,795, Cl. 350-620.000.
Takano, Satoshi; and Azumakawa, Tadashi, 4,586,976, Cl. 156-233.000.
Sumitomo Metal Industries, Ltd.: *See*—
Okamoto, Atsuki; and Takahashi, Masashi, 4,586,966, Cl. 148-12.00C.
Sumitomo Metal Mining Co., Ltd.: *See*—
Miyazaki, Shu, 4,587,185, Cl. 430-5.000.
Sumiyoshi, Ikuo, to Shiki Roll Kabushiki Kaisha. Ceramic filter tubes. 4,587,016, Cl. 210-323.200.
Sumner, John H.: *See*—
Lassiter, B. Dean; Daniel, Vernon T.; and Sumner, John H., 4,586,323, Cl. 57-1.00R.
Sumner, Leslie, to Gallaher Limited. Diaphragm pump or motor device. 4,586,883, Cl. 417-477.000.
Sun Chemical Corporation: *See*—
Chamberlain, Terence R., 4,587,339, Cl. 544-225.000.
Sunago, Katsuyoshi: *See*—
Ono, Kimizo; Takenaka, Shinya; and Sunago, Katsuyoshi, 4,586,795, Cl. 350-620.000.
Suncast Corporation: *See*—
Johnston, Damon A.; and Garcia, George L., 4,586,676, Cl. 242-86.000.
Sunshine, Abraham; Laska, Eugene M.; and Siegel, Carole E., to Analgesic Associates. Analgesic and anti-inflammatory compositions comprising caffeine and methods of using same. 4,587,249, Cl. 514-265.000.
Surgikos, Inc.: *See*—
Morris, Henrietta K., 4,586,498, Cl. 128-132.00D.
Surls, Joseph P., Jr.: *See*—
Livingston, Dana A.; and Surls, Joseph P., Jr., 4,587,116, Cl. 423-415.00A.
Suroff, Leonard W.: *See*—
Kolt, Stanley, 4,586,654, Cl. 236-49.000.
Sussman, Arthur, to Intraspec, Inc. Automated reversible-dryer control system. 4,586,267, Cl. 34-30.000.
Suter, Heinz, to Sprecher & Schuh AG. Auxiliary contact assembly for mounting onto an electromagnetic switch. 4,587,503, Cl. 335-135.000.
Suyama, Tadakazu: *See*—
Ueda, Yasuo; Shiraga, Yusei; Morimoto, Satoshi; Kagitani, Yoshio; Funakoshi, Satoshi; and Suyama, Tadakazu, 4,587,052, Cl. 260-239.30T.
Suzuki, Hiroyuki: *See*—
Yamamori, Eiji; and Suzuki, Hiroyuki, 4,587,567, Cl. 358-248.000.
Suzuki, Koji: *See*—
Miyake, Haruhisa; Ito, Hiroaki; Suzuki, Koji; and Yamada, Ryoji, 4,586,992, Cl. 204-98.000.
Suzuki, Sohbe: *See*—
Imai, Masaharu; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,587,562, Cl. 358-212.000.
Suzuki, Tadashi: *See*—
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Suzuki, Tadashi, 4,587,402, Cl. 219-343.000.
Suzuki, Takashi; Matsumura, Susumu; and Kitagishi, Nozomu, to Canon Kabushiki Kaisha. Area beam type splitter. 4,586,786, Cl. 350-169.000.
Suzuki, Yukio: *See*—
Nogami, Susumu; Suzuki, Yukio; Takahashi, Hiroshi; and Otsuka, Kan, 4,586,478, Cl. 123-489.000.
Svenska Varv Vindenergi AB: *See*—
Nygren, Ingemar, 4,586,400, Cl. 74-675.000.
Swan, Charles A., to Windows, Inc. Shallow double hung window. 4,586,291, Cl. 49-501.000.
Sweeney, William T., to Conoco Inc. Throttling bushing for shaft seal. 4,586,717, Cl. 277-15.000.
Sweeney, William T.; and Beck, Jeffrey L., to Conoco Inc. Apparatus for the reclamation of slurry from the bottom of a storage silo. 4,586,853, Cl. 406-14.000.
Swift, Allan W., to E. J. Brooks Company. Combination seal and locking pin. 4,586,570, Cl. 169-75.000.
Swihart, Terence J., to Dow Corning Corporation. Method for making carboxyfunctional silicone glycols. 4,587,320, Cl. 528-23.000.
Swinehart, Carl F., to Harshaw/Filtrol Partnership. Sodium iodide, light pipe. 4,586,785, Cl. 350-96.280.
Syntex (U.S.A.) Inc.: *See*—
Kennedy, Joe H.; Holland, A. Ronald; Richey, Thomas; and Alsup, James D., Jr., 4,586,762, Cl. 312-330.00R.
Szantay, Csaba: *See*—
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.
Szarka, Sandor: *See*—
Jaffa, David; and Szarka, Sandor, 4,586,433, Cl. 101-123.000.
Szporny, Laszlo : *See*—
Ezer, Elemer; Szporny, Laszlo ; Hajos, Gyorgy; Szantay, Csaba; Keve, Tibor; Fekete, Gyorgy; Megyeri, Gabor; Acs, Tibor; and Bolcskei, Hedvig, 4,587,251, Cl. 514-281.000.
TA Mfg., Inc.: *See*—
Jones, Kendall, 4,586,694, Cl. 251-149.200.
Tabuchi, Tsuyoshi: *See*—
Ikeya, Seizi; and Tabuchi, Tsuyoshi, 4,586,560, Cl. 164-457.000.
Tada, Ritsuro: *See*—
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, 4,587,162, Cl. 428-290.000.
Tadokoro, Joji: *See*—
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, 4,587,568, Cl. 358-293.000.
Tagiasco, Jean P., to J. T. Province S.A. Agricultural greenhouse with a flat roof. 4,586,297, Cl. 52-1.000.
Taguchi, Kazuo; and Okawa, Yogiro, to Asahi Breweries Ltd. Coating apparatus for scratches of glass bottle. 4,586,458, Cl. 118-72.000.
Taheri, Syde A. External shunt and method for procuring and preserving the endothelium of a vein used in arterial bypass. 4,586,919, Cl. 604-9.000.
Taiho Kogyo Co., Ltd.: *See*—
Kato, Yoshio; Nagamathu, Toshihiro; Tsurumi, Kazufumi; Nakayama, Shozo; and Kato, Kimio, 4,586,876, Cl. 417-269.000.
Taipale, Dale L.; Winkelman, John H.; and Adams, Thomas P., to Brandt, Inc. Coin handling and sorting. 4,586,522, Cl. 133-3.00E.
Takago, Toshio; Inoue, Yoshio; Terashima, Masami; and Sato, Shiniti, to Shin-Etsu Chemical, Co., Ltd. Novel organosilicon compound and a room temperature curable organopolysiloxane composition containing the same. 4,587,354, Cl. 556-417.000.
Takahashi, Akio: *See*—
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, 4,587,162, Cl. 428-290.000.
Takahashi, Akira; Danno, Yoshiaki; Iida, Kazumasa; and Iwata, Toshio, to Mitsubishi Jidosha Kogyo Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Ignition timing control apparatus for internal combustion engine. 4,586,475, Cl. 123-425.000.
Takahashi, Hiroshi: *See*—
Isoguchi, Seiichi; and Takahashi, Hiroshi, 4,586,806, Cl. 354-403.000.
Nogami, Susumu; Suzuki, Yukio; Takahashi, Hiroshi; and Otsuka, Kan, 4,586,478, Cl. 123-489.000.
Takahashi, Masashi: *See*—
Okamoto, Atsuki; and Takahashi, Masashi, 4,586,966, Cl. 148-12.00C.
Takahashi, Naohiro: *See*—
Sasaki, Yutaka; Nakamura, Toshio; Yamamoto, Hiroshi; Murata, Hiroshi; Nakamura, Yoshimi; and Takahashi, Naohiro, 4,587,226, Cl. 502-5.000.
Takahashi, Nobuaki: *See*—
Sugiyama, Hiroyuki; Takahashi, Nobuaki; Shibamoto, Takeshi; Sato, Hideo; Amano, Yoshiaki; and Tanaka, Koji, 4,587,558, Cl. 358-160.000.
Takahashi, Susumu, to Niigata Engineering Co., Ltd. Emergency disconnector for fluid loading and unloading lines. 4,586,537, Cl. 137-614.040.
Takahashi, Susumu, to Kanto Yakin Kogyo K.K. Gas atmosphere heating furnace. 4,586,899, Cl. 432-148.000.
Takahashi, Tomohiko: *See*—
Hachisuga, Takaaki; Takahashi, Tomohiko; Kagaya, Koji; and Nagashima, Masayoshi, 4,586,834, Cl. 400-120.000.
Takahashi, Toshio, to Fuji Jukogyo Kabushiki Kaisha. System for diagnosing an internal combustion engine. 4,587,615, Cl. 364-431.110.

Takahashi, Yasuhiro: *See*—
Kaneko, Tamaki; Takahashi, Yasuhiro; Okuzawa, Tsugio; Nakamura, Isao; and Ebata, Kohshi, 4,586,812, Cl. 355-24.000.
Takahashi, Yuji: *See*—
Saito, Jun; and Takahashi, Yuji, 4,587,536, Cl. 346-160.000.
Takai, Takao; Okada, Fumio; Odawara, Hiroyoshi; and Mitogawa, Fukumatsu, to Furukawa Mfg. Co., Ltd.; and Furukawa Kogyo Co., Ltd. Packing apparatus. 4,586,320, Cl. 53-512.000.
Takano, Satoshi; and Azumakawa, Tadashi, to Sumitomo Electric Industries, Ltd. Process for producing printed-wiring board. 4,586,976, Cl. 156-233.000.
Takaoka, Daizo: *See*—
Kosaka, Haruhisa; and Takaoka, Daizo, 4,587,376, Cl. 136-248.000.
Takara Company, New York, Inc.: *See*—
Nakatani, Masatoshi, 4,586,749, Cl. 297-330.000.
Takayama, Nobutoshi; Edakubo, Hiroo; and Takimoto, Hiroyuki, to Canon Kabushiki Kaisha. Video signal reproducing apparatus. 4,587,580, Cl. 360-77.000.
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, to OKI Electric Industry Co., Ltd. Electronic print board. 4,587,568, Cl. 358-293.000.
Takayama, Suguru; and Shigeta, Masao, to TDK Electronics Co., Ltd. Core of a choke coil comprised of amorphous magnetic alloy. 4,587,507, Cl. 336-178.000.
Takeda Chemical Industries, Ltd.: *See*—
Ono, Hideo; Nozaki, Yukimasa; and Harada, Setsuo, 4,587,333, Cl. 544-21.000.
Takeda, Renzo; Miki, Kazuyoshi; Ohga, Yukiharu; Fuse, Motomasa; Hiramoto, Kazuo; and Aoyama, Motoo, to Hitachi, Ltd. Fuel assembly for boiling water reactor. 4,587,089, Cl. 376-428.000.
Takeda, Yukinori: *See*—
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, 4,587,568, Cl. 358-293.000.
Takei, Toshihiro: *See*—
Watanabe, Kiyohiko; Hattori, Yoshiyuki; Matsui, Kazuma; Takei, Toshihiro; Nakamura, Toshiaki; and Ohnishi, Syunsaku, 4,586,877, Cl. 417-365.000.
Takemoto, Hisao: *See*—
Harada, Tuneo; Takemoto, Hisao; and Igarashi, Tatsuo, 4,587,214, Cl. 435-70.000.
Takenaka, Kiyosi: *See*—
Miyauchi, Yoshio; Takenaka, Kiyosi; and Bessho, Yoshihiko, 4,586,809, Cl. 355-10.000.
Takenaka, Shinya: *See*—
Ono, Kimizo; Takenaka, Shinya; and Sunago, Katsuyoshi, 4,586,795, Cl. 350-620.000.
Takimoto, Hiroyuki: *See*—
Takayama, Nobutoshi; Edakubo, Hiroo; and Takimoto, Hiroyuki, 4,587,580, Cl. 360-77.000.
Takumi, Lawrence I.: *See*—
Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., 4,586,719, Cl. 277-41.000.
Talbot, Douglas C.; and Witler, James L., to CMI, Inc. Breath analyzer. 4,587,427, Cl. 250-339.000.
Tamaki, Shohei: *See*—
Matsuda, Koichi; Tamaki, Shohei; Harada, Hiroshi; Nakashima, Masami; and Fujiyoshi, Makoto, 4,587,287, Cl. 524-404.000.
Tamamushi, Takashige: *See*—
Imai, Masaharu; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,587,562, Cl. 358-212.000.
Tamaru, Sinji: *See*—
Ohmori, Akira; Tomihashi, Nobuyuki; and Tamaru, Sinji, 4,587,165, Cl. 428-334.000.
Tamoto, Koji; and Umehara, Akira, to Fuji Photo Film Co., Ltd. Photopolymerizable composition comprising an acridine and a heterocyclic thiol compound as a photopolymerization initiator and a photographic process using said photopolymerizable composition. 4,587,200, Cl. 430-281.000.
Tamura Electric Works, Ltd.: *See*—
Tanaka, Mikio; Doki, Yoshikuni; Tsuruoka, Yoshihiro; Fujiwara, Masatoshi; and Shiga, Tatsuhide, 4,586,388, Cl. 73-862.580.
Tamura, Hidemasa: *See*—
Uedaira, Satoru; Yamanoi, Hiroshi; and Tamura, Hidemasa, 4,587,041, Cl. 252-572.000.
Tamura, Imao; and Maki, Tadashi, to Kyoto University. Fe-Ni-Ti-Co alloy with shape memory effect and pseudo-elasticity and method of producing the same. 4,586,969, Cl. 148-402.000.
Tamura, Katsuhide, to Canon Kabushiki Kaisha. Electro-optic display device and a method of producing the same. 4,587,038, Cl. 252-511.000.
Tamura, Takahiko; and Tokuhara, Masaharu, to Sony Corporation. CRT drive control circuit. 4,587,554, Cl. 358-74.000.
Tanaka, Chiaki; Kondou, Makoto; and Yamamoto, Yoshiyuki, to Toray Industries, Inc. Process for producing polyetheresteramides. 4,587,309, Cl. 525-419.000.
Tanaka, Gotaro: *See*—
Kyoto, Michihisa; Yoshioka, Naoki; Tanaka, Gotaro; Watanabe, Minoru; Shimba, Hiroshi; and Inagaki, Nobuo, 4,586,943, Cl. 65-3.120.
Tanaka, Hideki: *See*—
Iizuka, Masanori; and Tanaka, Hideki, 4,586,960, Cl. 106-90.000.
Tanaka, Hiroyuki: *See*—
Yokocho, Yoetsu; and Tanaka, Hiroyuki, 4,586,322, Cl. 56-12.700.
Tanaka, John S.; and Belef, William M., to Shofu Dental Corporation. Method and instrument for condensing restorative dental materials. 4,586,901, Cl. 433-164.000.
Tanaka, Kanji; and Ishiguro, Kazuhisa, to Sanyo Electric Co., Ltd.; and Tokyo Sanyo Electric Co., Ltd. Variable reactance circuit producing negative to positive varying reactance. 4,587,500, Cl. 333-213.000.
Tanaka, Kazuhiro: *See*—
Minami, Satoyuki; Tanaka, Kazuhiro; and Nishioka, Takeshi, 4,587,071, Cl. 264-210.700.
Tanaka, Kenji: *See*—
Kagitani, Yoshio; Ueda, Yasuo; Munechika, Kozi; Morimoto, Satoshi; Komeda, Shirou; Tanaka, Kenji; and Yokoyama, Kazumasa, 4,587,122, Cl. 424-101.000.
Tanaka, Koji: *See*—
Sugiyama, Hiroyuki; Takahashi, Nobuaki; Shibamoto, Takeshi; Sato, Hideo; Amano, Yoshiaki; and Tanaka, Koji, 4,587,558, Cl. 358-160.000.
Tanaka, Kunio: *See*—
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Tanaka, Mikio; Doki, Yoshikuni; Tsuruoka, Yoshihiro; Fujiwara, Masatoshi; and Shiga, Tatsuhide, to Tamura Electric Works, Ltd. Three force balanced mechanism. 4,586,388, Cl. 73-862.580.
Tanaka, Takeshi; Jotatsu, Masao; Higaki, Masaaki; Hamada, Toshimasa; Hashikawa, Tadashi; Ohashi, Toneri; and Togawa, Seigo, to Kabushiki Kaisha Kobe Seiko Sho. Bearing supporting system for cone crusher. 4,586,664, Cl. 241-213.000.
Tanaka, Tsunefumi; and Ikemori, Keiji, to Canon Kabushiki Kaisha. Zoom lens. 4,586,793, Cl. 350-426.000.
Tanaka, Yoshito: *See*—
Nakayama, Koichi; and Tanaka, Yoshito, 4,587,440, Cl. 307-268.000.
Taniguchi, Nobuyuki: *See*—
Tominaga, Shinji; Nakai, Masaaki; Inoue, Norihiro; Fujino, Akihiko; Inoue, Manabu; and Taniguchi, Nobuyuki, 4,586,800, Cl. 354-21.000.
Tanimoto, Akikazu, to Nippon Kogaku K. K. Inspecting method for mask for producing semiconductor device. 4,586,822, Cl. 356-394.000.
Tanimoto, Yasufumi; Watanabe, Junji; and Sogo, Toshiyuki, to Tokyo Shibaura Denki Kabushiki Kaisha. Optical system drive for image formation apparatus. 4,586,808, Cl. 355-8.000.
Tanioku, Shozo: *See*—
Makita, Muneharu; and Tanioku, Shozo, 4,587,308, Cl. 525-373.000.
Tank, Eggert; and Straub, Peter, to Daimler-Benz Aktiengesellschaft. Process for manufacturing fiber reinforced light metal castings. 4,586,554, Cl. 164-97.000.
Tantram, Anthony D. S.; and Chan, Yat S., to City Technology Limited. Gas sensor. 4,587,003, Cl. 204-412.000.
Tao, Eddie V. P.: *See*—
Brennan, John; and Tao, Eddie V. P., 4,587,348, Cl. 548-378.000.
Taomo, Toshio: *See*—
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Tate & Lyle Public Limited Company: *See*—
Bucke, Christopher; and Cheetham, Peter S. J., 4,587,119, Cl. 424-48.000.
Taylor, Attalee S.: *See*—
Cobaugh, Robert F.; Fedder, James L.; and Taylor, Attalee S., 4,586,772, Cl. 339-75.0MP.
Taylor, Beverly W., to Handi-Pac, Inc. Utility booster chair. 4,586,747, Cl. 297-250.000.
Taylor, Steven C.: *See*—
Schas, Marc L.; and Taylor, Steven C., 4,587,514, Cl. 340-347.0DD.
TDK Corporation: *See*—
Nishimatsu, Masaharu; Ide, Toshiaki; Arioka, Hiroyuki; and Kubota, Yuichi, 4,587,150, Cl. 428-141.000.
Yagi, Hiroshi; Harada, Yoshio; and Ito, Tetsuro, 4,586,544, Cl. 140-105.000.
TDK Electronics Co., Ltd.: *See*—
Takayama, Suguru; and Shigeta, Masao, 4,587,507, Cl. 336-178.000.
Technion Research & Development Foundation, Ltd.: *See*—
Cais, Michael; and Shimoni, Moshe, 4,587,221, Cl. 436-500.000.
Tecnodia, s.r.l.: *See*—
Costa, Gianluigi, 4,586,321, Cl. 53-520.000.
Teener, Michael D.: *See*—
Nelson, Gary A.; Godding, Patrick N.; Schumaker, Richard E.; Walter, Keith D.; Marrone, Edward S.; Gates, Stillman F.; Rigsbee, Everett O., III; and Teener, Michael D., 4,587,651, Cl. 370-88.000.
Tektronix, Inc.: *See*—
Penney, Bruce J., 4,587,551, Cl. 358-10.000.
Telecummunications Radioelectriques et Telephoniques T.R.T.: *See*—
Bonnerot, Georges; and Daout, Michel, 4,587,498, Cl. 329-122.000.
Tellier, Jacques: *See*—
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Tengler, John N.; and Pilny, James C., to Chabin Corporation. Electrical connector terminator. 4,586,769, Cl. 339-59.00R.
Tengler, John N.: *See*—
Ollis, Frederick R.; and Tengler, John N., 4,586,776, Cl. 339-105.000.
Tenhaven, Ulrich: *See*—
Diener, Arnulf; Kettler, Hans; and Tenhaven, Ulrich, 4,587,135, Cl. 427-13.000.
Tennant Company: *See*—
Bricher, Charles W.; and Snetting, Mark E., 4,586,213, Cl. 15-320.000.

Trevarthen, Donald S., 4,586,208, Cl. 8-158.000.

Tennessee Valley Authority: *See—*
Blouin, Glenn M., 4,587,358, Cl. 564-3.000.

Teramachi, Hiroshi. Bearing unit. 4,586,758, Cl. 308-6.00C.

Terashima, Kazutaka: *See—*
Katsumata, Tooru; Terashima, Kazutaka; Nakajima, Hiroaki; and Fukuda, Tsuguo, 4,586,979, Cl. 156-601.000.

Terashima, Masami: *See—*
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Texaco Inc.: *See—*
Currie, William S.; and DeBaun, David R., 4,587,642, Cl. 367-40.000.
Darden, Jerome W., 4,587,028, Cl. 252-76.000.

Texas Instruments Incorporated: *See—*
Ferrio, Tom M.; and Gerwig, Floyd R., 4,587,634, Cl. 364-900.000.
Rao, G. R. Mohan, 4,587,542, Cl. 357-23.600.

Thaler, Warren A.; Brois, Stanley J.; and Ferrara, Francis N., to Exxon Research and Engineering Co. Sulfomaleation of polyolefins. 4,587,304, Cl. 525-285.000.

Thannheiser, Axel: *See—*
Kranefeld, Andreas; and Thannheiser, Axel, 4,586,217, Cl. 19-80.00R.

Theeuwes, Felix, to ALZA Corporation. Intravenous system for delivering a beneficial agent. 4,586,922, Cl. 604-85.000.

Theeuwes, Felix: *See—*
Edgren, David; Wong, Patrick S. L.; and Theeuwes, Felix, 4,587,117, Cl. 424-15.000.

Theodorides, Vassilios J.: *See—*
Chow, Alfred W.; and Theodorides, Vassilios J., 4,587,361, Cl. 564-179.000.

Thermo King Corporation: *See—*
Aman, Robert C., Jr., 4,586,875, Cl. 417-228.000.

Thiel, Rudolf, to ITT Industries, Inc. Vacuum brake booster. 4,586,427, Cl. 91-369.00A.

Thiessen, Cornelius. Liquid chemical incorporator assembly. 4,586,444, Cl. 111-6.000.

Thomas A. Schutz Co., Inc.: *See—*
Eckert, Ronald P., 4,586,619, Cl. 211-189.000.

Thomas & Betts Corporation: *See—*
Gandolfo, Paul J., 4,586,610, Cl. 206-485.000.

Thomas, Martin, Jr., to Ionics Incorporated. One step process for preparing anion exchange polymers. 4,587,269, Cl. 521-38.000.

Thomason, William H.: *See—*
Ivie, Randall G.; and Thomason, William H., 4,586,371, Cl. 73-150.00A.

Thompson, James E.: *See—*
Hardy, Frederick E.; and Thompson, James E., 4,587,054, Cl. 260-410.500.

Thompson, Morice W.: *See—*
Davies, Stephen P.; and Thompson, Morice W., 4,587,290, Cl. 524-558.000.

Thomson-CSF: *See—*
Briere, Pierre, 4,586,239, Cl. 29-571.000.
Do-huu, Jean-Paul; and Hartemann, Pierre, 4,586,512, Cl. 128-660.000.
Huignard, Jean-Pierre; Rak, Daniel; Ledoux, Isabelle; and Herriau, Jean-Pierre, 4,586,779, Cl. 350-364.000.
Munier, Bernard; and Arques, Marc, 4,587,426, Cl. 250-338.000.

Thomson, David S.: *See—*
Arnould, Jean C.; Evans, John R.; Jones, Geraint; and Thomson, David S., 4,587,262, Cl. 514-548.000.

Thorsett, Eugene D.: *See—*
Harris, Elbert E.; Thorsett, Eugene D.; and Patchett, Arthur A., 4,587,050, Cl. 260-239.30R.
Harris, Elbert E.; Patchett, Arthur A.; and Thorsett, Eugene D., 4,587,238, Cl. 514-183.000.

Thyssen Stahl AG: *See—*
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TI (Group Services) Limited: *See—*
Davenport, John; and Russo, Michael A., 4,587,458, Cl. 315-111.010.

Tichy, Oldrich J.; and Meissner, Konrad E., to Atlas Pacific Engineering Company. Press for extracting juice from comestible solids and semi-solids such as fruit and vegetables. 4,586,430, Cl. 100-118.000.

Tidmarsh, Brian J.: *See—*
Logie, Frank M.; Vine, George; Tidmarsh, Brian J.; and Potter, James C., 4,587,505, Cl. 335-266.000.

Till, Robert A., Jr.: *See—*
Engstrom, John G.; and Till, Robert A., Jr., 4,587,517, Cl. 340-542.000.

Tinner, Friedrich, to Cetec AG. Shut-off apparatus. 4,586,693, Cl. 251-56.000.

Toaz, Milton E.; and Smalc, Martin D., to Imperial Clevite Inc. Cast metal composite article. 4,587,177, Cl. 428-614.000.

Tobioka, Takashi: *See—*
Nishizawa, Tetuo; Asano, Seiji; Ishiguro, Minoru; Komori, Masanoshin; Tobioka, Takashi; Yoshida, Toshio; and Hara, Hiroshi, 4,586,801, Cl. 354-173.100.

Tochigi, Kenji; Hanyu, Yoshiaki; and Hiratsuka, Yutaka, to Hitachi, Ltd. Laser Raman microprobe. 4,586,819, Cl. 356-301.000.

Todd, Ray R., Jr. Toilet air purifier apparatus. 4,586,201, Cl. 4-217.000.

Togawa, Seigo: *See—*
Tanaka, Takeshi; Jotatsu, Masao; Higaki, Masaaki; Hamada, Toshimasa; Hashikawa, Tadashi; Ohashi, Toneri; and Togawa, Seigo, 4,586,664, Cl. 241-213.000.

Toko, Inc.: *See—*
Nakayama, Koichi; and Tanaka, Yoshito, 4,587,440, Cl. 307-268.000.

Tokuhara, Masaharu: *See—*
Tamura, Takahiko; and Tokuhara, Masaharu, 4,587,554, Cl. 358-74.000.

Tokuhara, Mitsuhiro; and Minami, Setsuo, to Canon Kabushiki Kaisha. Variable power projecting device. 4,586,814, Cl. 355-55.000.

Tokunaga, Toshimichi; and Kanai, Seita, to Mazda Motor Corporation. Vehicle suspension means having variable suspension characteristics. 4,586,728, Cl. 280-707.000.

Tokuno, Masateru; Sawada, Tetsuya; Hoshiyama, Hidetoshi; and Yoneda, Toshihiro, to Rengo Co., Ltd. Device for replacing plate cylinders. 4,586,434, Cl. 101-178.000.

Tokuno, Masateru; Sawada, Tetsuya; and Ishii, Yoshihiro, to Rengo Co., Ltd. Apparatus for automatically mounting a web roll on a mill roll stand. 4,586,673, Cl. 242-58.600.

Tokura, Kimihide: *See—*
Iwamoto, Tadashi; and Tokura, Kimihide, 4,587,582, Cl. 360-93.000.

Tokuyama Soda Kabushiki Kaisha: *See—*
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Tokyo Rope Mfg. Co., Ltd.: *See—*
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Tokyo Sanyo Electric Co., Ltd.: *See—*
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Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Ando, Hideo, 4,587,648, Cl. 369-275.000.
Hamanaka, Kunio, 4,587,586, Cl. 360-99.000.
Iwamoto, Tadashi; and Tokura, Kimihide, 4,587,582, Cl. 360-93.000.
Matsuda, Hideo, 4,587,550, Cl. 357-79.000.
Munetsugu, Eiichi; and Ushiki, Hiroshi, 4,587,519, Cl. 340-711.000.
Murakami, Koichi; and Mase, Katsuyoshi, 4,587,438, Cl. 307-252.00C.
Ohmura, Hideo; Oowa, Takeshi; Nakamura, Kunihiko; and Nakada, Masashi, 4,586,232, Cl. 29-426.300.
Ohtani, Ryoichi; and Ohshima, Iwao, 4,587,543, Cl. 357-25.000.
Saitoh, Yuichi, 4,587,640, Cl. 365-229.000.
Satoh, Jinichi; Ino, Hideya; Ishikawa, Masaaki; and Iguchi, Michihisa, 4,586,705, Cl. 271-122.000.
Tanimoto, Yasufumi; Watanabe, Junji; and Sogo, Toshiyuki, 4,586,808, Cl. 355-8.000.
Tomita, Seiji, 4,587,583, Cl. 360-93.000.
Ushiku, Yukihiro, 4,587,549, Cl. 357-71.000.
Watanabe, Yoshihiro, 4,587,408, Cl. 235-379.000.

Tomalia, Donald A.; and Dewald, James R., to Dow Chemical Company, The. Dense star polymers having two dimensional molecular diameter per EXR. 4,587,329, Cl. 528-363.000.

Toman, Perry A., to SCM Corporation. Polyester resin gelkote composition. 4,587,323, Cl. 528-66.000.

Tomida, Yoshinori: *See—*
Hirai, Yutaka; Tomida, Yoshinori; Matsuda, Hiroshi; and Nishimura, Yukuo, 4,586,980, Cl. 156-655.000.

Tomihashi, Nobuyuki: *See—*
Ohmori, Akira; Tomihashi, Nobuyuki; and Tamaru, Sinji, 4,587,165, Cl. 428-334.000.

Tominaga, Shinji; Nakai, Masaaki; Inoue, Norihiro; Fujino, Akihiko; Inoue, Manabu; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Data reading device for automatically reading film cartridge data. 4,586,800, Cl. 354-21.000.

Tomioka, Hiroyuki: *See—*
Masumoto, Tsuyoshi; Inoue, Akihisa; and Tomioka, Hiroyuki, 4,586,957, Cl. 75-124.000.

Tomita, Seiji, to Tokyo Shibaura Denki Kabushiki Kaisha. Tape player. 4,587,583, Cl. 360-93.000.

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Tomoda, Toshimasa; Fukakusa, Shinji; and Yamashita, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Methods of improving radiation resistant characteristic of BF_3 proportional counters. 4,587,429, Cl. 250-375.000.

Toolex Alpha AB: *See—*
Lindell, Curt O., 4,586,531, Cl. 137-334.000.

Top Notcher Enterprises, Inc.: *See—*
Garrett, Ernest, 4,586,625, Cl. 220-266.000.

Toray Industries, Inc.: *See—*
Higuchi, Akira; and Shimizu, Hisao, 4,587,142, Cl. 428-15.000.
Minami, Satoyuki; Tanaka, Kazuhiro; and Nishioka, Takeshi, 4,587,071, Cl. 264-210.700.
Tanaka, Chiaki; Kondou, Makoto; and Yamamoto, Yoshiyuki, 4,587,309, Cl. 525-419.000.
Yamamoto, Ryuichi; and Nojiri, Hironobu, 4,586,679, Cl. 242-176.000.

Torelli, Guido; and Devecchi, Daniele, to SGS-ATES Componenti Elettronici S.p.A. Interface circuit for signal generators with two non-overlapping phases. 4,587,441, Cl. 307-269.000.

Torikoshi, Kunikazu: *See—*
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Tornya, Isolde. Balustrade construction. 4,586,697, Cl. 256-65.000.

Torres, Jose: *See—*
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Torrisi, Angelo M.; and Urbano, Roland, to Torrisi, Angelo M. System and a method for mounting film to a sample holder for X-ray spectroscopic fluorescence analysis. 4,587,666, Cl. 378-47.000.
Tosaki, Hiromi; Mozume, Teruo; Arima, Hideo; and Ikegami, Akira, to Hitachi, Ltd. Thick film thermistor composition. 4,587,040, Cl. 252-519.000.
Tottori Sanyo Electric Co., Ltd.: *See—*
Tutino, Kunio, 4,587,584, Cl. 360-96.300.
Toukhy, Medhat A., to Philip A. Hunt Chemical Corporation. Positive photoresist with cresol-formaldehyde novolak resin and photosensitive naphthoquinone diazide. 4,587,196, Cl. 430-192.000.
Tournier, Herve, to Beghin-Say S.A. Salified acrylic allyloligosaccharide copolymer, a process for preparing the copolymer, and application as a super-absorbent. 4,587,319, Cl. 527-313.000.
Toutin, Paul, to Societe Europeenne de Propulsion. System for firing a propellent charge by pyrotechnical transmission. 4,586,420, Cl. 89-1.702.
Towa Nittoku Engineering Kabushiki Kaisha: *See—*
Harada, Mamoru, 4,586,645, Cl. 228-15.100.
Toyo Boseki Kabushiki Kaisha: *See—*
Miyagi, Morio; Ohno, Makoto; and Kanaizumi, Masaru, 4,587,168, Cl. 428-369.000.
Shinohara, Kazuhiro; Abe, Shunzo; and Miyake, Hideo, 4,586,996, Cl. 522-7.000.
Toyo Communication Equipment Co., Ltd.: *See—*
Miyayama, Takashi, 4,587,499, Cl. 331-176.000.
Toyo Engineering Corporation: *See—*
Matsubara, Tetsuyuki; Ito, Norifumi; Ichikawa, Kouzo; Arahari, Kouichi; and Maeda, Tetsuo, 4,587,294, Cl. 525-53.000.
Toyo Seikan Kaisha, Ltd.: *See—*
Morimoto, Kenji; Ikegami, Tamotsu; Naito, Masao; Kubo, Tateo; and Kizawa, Shinichi, 4,586,863, Cl. 413-14.000.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Arika, Junji; Aimoto, Michiyuki; and Miyazaki, Hiroshi, 4,587,115, Cl. 423-329.000.
Harada, Tuneo; Takemoto, Hisao; and Igarashi, Tatsuo, 4,587,214, Cl. 435-70.000.
Tsukuma, Koji; Ueda, Kuniyoshi; and Tsukidate, Takaaki, 4,587,225, Cl. 501-105.000.
Toyoda Gosei Co., Ltd.: *See—*
Murachi, Tatsuya, 4,587,149, Cl. 428-90.000.
Souchi, Toshiyuki; Fujiyama, Hisanori; and Hagi, Mitsuo, 4,586,253, Cl. 29-796.000.
Toyoda Koki Kabushiki Kaisha: *See—*
Ohkoshi, Fumihiko; Hasegawa, Toshifumi; and Kanii, Norikazu, 4,586,860, Cl. 409-233.000.
Toyofuku, Hatsunori; Tsuriya, Yoshihiro; Kuroda, Toshio; Aoki, Hitoshi; and Nagasawa, Hiroshi, to Wakamoto Pharmaceutical Co., Ltd. 1,3,4-thiadiazole derivatives, process for the production thereof and use thereof as antiulcer agent. 4,587,254, Cl. 514-326.000.
Toyota Jidosha Kabushiki Kaisha: *See—*
Fukuchi, Hisashi; Inui, Masaki; and Iwata, Hideyuki, 4,586,395, Cl. 74-467.000.
Nogami, Susumu; Suzuki, Yukio; Takahashi, Hiroshi; and Otsuka, Kan, 4,586,478, Cl. 123-489.000.
Okumura, Takeshi; Nakanishi, Kiyoshi; and Matsushita, Souichi, 4,586,469, Cl. 123-308.000.
Transicoil, Inc.: *See—*
Piguet, Paul, 4,587,387, Cl. 200-67.00D.
Transue, James A.: *See—*
Bedi, James J.; Golden, Donald M.; and Transue, James A., 4,586,502, Cl. 128-334.00R.
Trautman, George H., Jr.: *See—*
Reinhorn, Andrei; and Trautman, George H., Jr., 4,586,361, Cl. 72-389.000.
Tremblay, Yves; Kawasaki, Brian S.; and Bilodeau, Francois, to Canadian Patents & Dev. Limited. Modal-insensitive biconical taper couplers. 4,586,784, Cl. 350-96.150.
Treuner, Uwe D.: *See—*
Breuer, Hermann; Siusarchyk, William A.; Denzel, Theodor; and Treuner, Uwe D., 4,587,047, Cl. 260-239.00A.
Trevarthen, Donald S., to Tennant Company. Floor maintenance machine and method. 4,586,208, Cl. 8-158.000.
Tri Tool, Inc.: *See—*
Nall, Lawson H., 4,586,407, Cl. 82-1.00C.
Troupes, Demetrios: *See—*
Alexander, Randall W.; and Troupes, Demetrios, 4,586,835, Cl. 400-121.000.
Troxler Electronic Laboratories, Inc.: *See—*
Regimand, Ali; and Molbert, John L., 4,587,623, Cl. 364-571.000.
Truskalo, Walter, to RCA Corporation. Dynamic focus circuit. 4,587,465, Cl. 315-382.000.
Trutzschler GmbH & Co. KG: *See—*
Kranefeld, Andreas; and Thannheiser, Axel, 4,586,217, Cl. 19-80.00R.
TRW Inc.: *See—*
Burge, Harland L.; and Hardgrove, John A., 4,586,443, Cl. 110-347.000.
Gray, Joseph H., 4,587,626, Cl. 364-726.000.
Tseng, Charles C., to Baxter Travenol Laboratories, Inc. Tubing occluder pump. 4,586,882, Cl. 417-477.000.
Ts'O, Paul O. P.: *See—*
Miller, Paul S.; and Ts'O, Paul O. P., 4,587,044, Cl. 530-211.000.
Tsolkas, Ilias. Liquid level actuator. 4,586,532, Cl. 137-426.000.
Tsubota, Yasumasa: *See—*
Shibahata, Yasuji; Tsubota, Yasumasa; and Uno, Takaaki, 4,586,581, Cl. 180-140.000.
Tsuda, Momotoshi; and Arakawa, Jun, to Fuji Photo Film Co., Ltd. Color image-forming process. 4,587,207, Cl. 430-389.000.
Tsuji, Masao: *See—*
Sarugaku, Shinichi; and Tsuji, Masao, 4,587,398, Cl. 219-124.220.
Tsukamoto, Kotaro. Machine for straightening and polishing a round bar. 4,586,223, Cl. 29-90.500.
Tsukidate, Takaaki: *See—*
Tsukuma, Koji; Ueda, Kuniyoshi; and Tsukidate, Takaaki, 4,587,225, Cl. 501-105.000.
Tsukiji, Norio: *See—*
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.
Tsukuma, Koji; Ueda, Kuniyoshi; and Tsukidate, Takaaki, to Toyo Soda Manufacturing Co., Ltd. High-strength zirconia type sintered body. 4,587,225, Cl. 501-105.000.
Tsunekawa, Tokuichi; Sakai, Shinji; and Kinoshita, Takao, to Canon Kabushiki Kaisha. Photo-detecting device with storage time control. 4,587,415, Cl. 250-204.000.
Tsunoda, Taiji, to Pioneer Electronic Corporation. Tape position data recording and reproduction method. 4,587,577, Cl. 360-72.200.
Tsuriya, Yoshihiro: *See—*
Toyofuku, Hatsunori; Tsuriya, Yoshihiro; Kuroda, Toshio; Aoki, Hitoshi; and Nagasawa, Hiroshi, 4,587,254, Cl. 514-326.000.
Tsurubuchi, Tetsuo; Sekiguchi, Toru; and Araki, Shigeru, to NEC Corporation. Tape address synchronizing apparatus for video tape recorder. 4,587,574, Cl. 360-14.300.
Tsurumi, Kazufumi: *See—*
Kato, Yoshio; Nagamathu, Toshihiro; Tsurumi, Kazufumi; Nakayama, Shozo; and Kato, Kimio, 4,586,876, Cl. 417-269.000.
Tsuruoka, Yoshihiro: *See—*
Tanaka, Mikio; Doki, Yoshikuni; Tsuruoka, Yoshihiro; Fujiwara, Masatoshi; and Shiga, Tatsuhide, 4,586,388, Cl. 73-862.580.
Tuji, Yoshimasa: *See—*
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Turner, Paul F., to BSD Medical Corporation. Apparatus for creating hyperthermia in tissue. 4,586,516, Cl. 128-804.000.
Turtle, Brian L., to BP Chemicals Limited. Polyethylene blend and film. 4,587,303, Cl. 525-240.000.
Turvey, Simon, to Lucas Industries public limited company. Stepper motor control circuit. 4,587,473, Cl. 318-696.000.
Tuskos, Michael. Sewing machine needle positioner. 4,586,447, Cl. 112-274.000.
Tutino, Kunio, to Sanyo Electric Co., Ltd.; and Tottori Sanyo Electric Co., Ltd. Rewind lever for a reciprocating type tape recorder. 4,587,584, Cl. 360-96.300.
Twinoak Products, Inc.: *See—*
Meloy, Gilbert K., 4,587,069, Cl. 264-102.000.
Tylor, Richard E.: *See—*
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UBE Industries, Ltd.: *See—*
Ueno, Toyoaki, 4,586,539, Cl. 137-625.380.
Uchida, Mitsunobu, to Kabushiki Gaisha Sanko. Toilet seat cover. 4,586,202, Cl. 4-242.000.
Uchikawa, Sadao: *See—*
Azekura, Kazuo; Kawashima, Katsuyuki; Inoue, Kotaro; and Uchikawa, Sadao, 4,587,078, Cl. 376-267.000.
Ueda, Kuniyoshi: *See—*
Tsukuma, Koji; Ueda, Kuniyoshi; and Tsukidate, Takaaki, 4,587,225, Cl. 501-105.000.
Ueda, Shigeki, to Matsushita Electric Industrial Co., Ltd. Heating apparatus having a sensor for terminating operation. 4,587,393, Cl. 219-10.55B.
Ueda, Takeo: *See—*
Saito, Hiroyuki; and Ueda, Takeo, 4,586,678, Cl. 242-107.40D.
Ueda, Yasuo; Shiraga, Yusei; Morimoto, Satoshi; Kagitani, Yoshio; Funakoshi, Satoshi; and Suyama, Tadakazu, to Green Cross Corporation, The. 1H-pyrrolo-[2,1-C][1,4]benzodiazepine-2-acrylamide compounds having antitumor activity. 4,587,052, Cl. 260-239.30T.
Ueda, Yasuo: *See—*
Kagitani, Yoshio; Ueda, Yasuo; Munechika, Kozi; Morimoto, Satoshi; Komeda, Shirou; Tanaka, Kenji; and Yokoyama, Kazumasa, 4,587,122, Cl. 424-101.000.
Uedaira, Satoru; Yamanoi, Hiroshi; and Tamura, Hidemasa, to Sony Corporation. Method for manufacturing dielectric metal titanate. 4,587,041, Cl. 252-572.000.
Uejima, Hideyuki: *See—*
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Uemura, Eisuke, to Jeol Ltd. Specimen manipulating mechanism for charged-particle beam instrument. 4,587,431, Cl. 250-442.100.
Ueno, Toyoaki, to UBE Industries, Ltd. Flow adjusting valve and die casting machine incorporating the same. 4,586,539, Cl. 137-625.380.
Uesaka, Susumu; and Harada, Noriyuki, to Nippon Light Metal Co. Ltd. Device for making frozen confections. 4,586,826, Cl. 366-144.000.
Ulrych, Gerhard, to Kraftwerk Union Aktiengesellschaft. Nuclear reactor. 4,587,086, Cl. 376-399.000.
Ulubay, Hasan: *See—*
Poppel, Gunter; and Ulubay, Hasan, 4,586,982, Cl. 162-5.000.

Umeda, Takao; Miyashita, Takao; Shimazaki, Yuzuru; Igawa, Tatsuo; Sasaki, Ken; and Matsuyama, Shigeru, to Hitachi, Ltd. Display panel having uniaxially-stretched organic polymer film as the substrate. 4,586,790, Cl. 350-337.000.
Umehara, Akira: *See—*
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Umesaki, Shigeo: *See—*
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Yamakawa, Toru; Makita, Fujio; Umezawa, Mitsuo; and Sakakiyama, Ryuzo, 4,586,583, Cl. 180-247.000.
Underwater Storage Limited: *See—*
Hickey, Christopher D. D.; and Parker, Bernhard D., 4,586,421, Cl. 89-1.810.
Ungar, Karl-Heinz; and Cepin, Hermann, to Mannesmann Aktiengesellschaft. Feed through structure for electrodes in electric furnaces. 4,587,659, Cl. 373-96.000.
Unger, Peter: *See—*
Lane, Christopher C.; Anonychuk, Alexander B.; and Unger, Peter, 4,587,332, Cl. 536-102.000.
Union Carbide Corporation: *See—*
Kokta, Milan R., 4,587,035, Cl. 252-301.40F.
Watson, Stuart L., Jr.; and Humphreys, Gordon R., 4,587,301, Cl. 525-123.000.
Union Oil Company of California: *See—*
Outmans, H. Donald, 4,586,376, Cl. 73-432.00R.
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Uniroyal Chemical Company, Inc.: *See—*
Johnson, Constance A.; and Merijanian, Aspet V., 4,587,140, Cl. 427-372.200.
Uniroyal Power Transmission Company, Inc.: *See—*
Cathey, Thaddeus F.; and Nelson, Rodney J., 4,586,915, Cl. 474-205.000.
U. S. Baird Corporation, The: *See—*
Allweier, Werner K.; and Knight, David W., 4,586,357, Cl. 72-137.000.
United States Gypsum Company: *See—*
Balinski, Henry A., 4,586,305, Cl. 52-241.000.
Lat, Geronimo E.; and Williams, Terrance L., 4,587,173, Cl. 428-457.000.
U.S. Highway Products, Inc.: *See—*
Block, Harvey P., 4,586,413, Cl. 83-522.000.
Block, Harvey P., 4,586,414, Cl. 83-522.000.
United States Movidyn Corporation: *See—*
Preusch, Robert W.; O'Farrell, Thomas F.; and O'Neal, Ollie, Jr., 4,587,027, Cl. 252-73.000.
United States of America
Administrator, National Aeronautics and Space Administration: *See—*
Mikroyannidis, John A.; and Kourtides, Demetrius A., 4,587,324, Cl. 528-108.000.
Army: *See—*
Chandra, Suresh; and Rohde, Robert S., 4,586,821, Cl. 356-363.000.
Spielvogel, Bernard F.; McPhail, Andrew T.; and Hall, Iris H., 4,587,359, Cl. 564-8.000.
Energy: *See—*
Berdahl, Paul H., 4,586,350, Cl. 62-467.000.
Carroll, Thomas A.; and Yetter, Harold H., 4,586,292, Cl. 51-2.00R.
Colburn, Richard P., 4,587,083, Cl. 376-313.000.
Frederickson, James R.; Harper, William H.; and Perez, Raymond, 4,586,740, Cl. 294-1.100.
Harrah, Larry A.; and Zeigler, John M., 4,587,205, Cl. 430-326.000.
Hawke, Basil C., 4,587,084, Cl. 376-336.000.
Hutter, Ernest, 4,587,085, Cl. 376-336.000.
Joubert, James I., 4,587,113, Cl. 423-244.000.
Keefer, Keith D.; and Michalske, Terry A., 4,587,224, Cl. 501-4.000.
Rice, Gary; D'Silva, Arthur P.; and Fassel, Velmer A., 4,586,368, Cl. 73-23.100.
National Aeronautics and Space Administration: *See—*
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Argoud, Maurice J.; Walker, Walter L.; and Butler, Lloyd V., 4,586,487, Cl. 126-418.000.
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Keller, Teddy M., 4,587,325, Cl. 528-172.000.
U.S. Philips Corporation: *See—*
de Vries, Coos, 4,587,515, Cl. 340-506.000.
Doornhein, Laurens; Raven, Johannes G.; Welles, Petrus W. G.; Annegarn, Marcellinus J. J. C.; and Nillesen, Antonius H. H. J., 4,587,557, Cl. 358-140.000.
Kasperkovitz, Wolfdietrich G.; and Dullemond, Dirk J., 4,587,478, Cl. 323-316.000.
Muller, Johannes C. A.; and Schout, Arnoldus R. C., 4,586,373, Cl. 73-162.000.
Romberg, Hendrik, 4,586,944, Cl. 65-79.000.
Van Roessel, Frederik J., 4,587,439, Cl. 307-265.000.
Wrana, Josef B. V., 4,586,439, Cl. 102-438.000.
U.S. Plywood Corporation: *See—*
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Jennings, Harriet E., 4,586,308, Cl. 52-393.000.
United Technologies Corporation: *See—*
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United Technologies Diesel Systems, Inc.: *See—*
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Unitika Ltd.: *See—*
Masumoto, Tsuyoshi; Inoue, Akihisa; and Tomioka, Hiroyuki, 4,586,957, Cl. 75-124.000.
Universal Prosthetics, Inc.: *See—*
Sisson, George A.; Berktold, Robert E.; and Lynch, Henry W., 4,586,505, Cl. 128-344.000.
University of California, The Regents of the: *See—*
Goodman, Murray; Castagnoli, Neal; Jacobson, Kenneth; Melmon, Kenneth L.; Rosenkranz, Roberto P.; and Verlander, Michael S., 4,587,046, Cl. 530-330.000.
University of Dayton: *See—*
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University of New Mexico: *See—*
Kirsch, Wolff M.; Hua, Zhu Y.; and Cushman, Robert B., 4,586,503, Cl. 128-334.00R.
University of Queensland: *See—*
Kitipornchai, Sritawat, 4,586,550, Cl. 144-353.000.
University of South Alabama: *See—*
Wheeler, Alfred P.; and Sikes, C. Steven, 4,587,021, Cl. 210-698.000.
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Uno, Takaaki: *See—*
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UOP Inc.: *See—*
DeGraff, Richard R., 4,587,370, Cl. 585-450.000.
Hirsh, Jody K., 4,587,215, Cl. 435-96.000.
Uotani, Osamu: *See—*
Ozawa, Toshiyuki; Uotani, Osamu; and Hayashi, Rieko, 4,587,120, Cl. 424-57.000.
Uzani GmbH: *See—*
Sartor, Bruno; Huftle, Jurgen; Strasmann, Burkhart; and Fischer, Franz-Josef, 4,586,224, Cl. 29-121.200.
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Torrisi, Angelo M.; and Urbano, Roland, 4,587,666, Cl. 378-47.000.
Urso, Charles L. Multi-motion dental flosser. 4,586,521, Cl. 132-92.00R.
Ushiki, Hiroshi: *See—*
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Ushiku, Yukihiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Multilayer interconnection structure for semiconductor device. 4,587,549, Cl. 357-71.000.
USM Corporation: *See—*
Bandura, Vitaly; and Sooy, Robert J., 4,586,237, Cl. 29-566.300.
Bauer, Herbert; Waibel, Hans; and Speisebecher, Joachim, 4,586,636, Cl. 222-146.500.
Dean, Sidney; and Butcher, John G., 4,586,362, Cl. 72-391.000.
Dean, Sidney; and Butcher, John G., 4,586,363, Cl. 72-391.000.
Powderley, John; and Evans, Ronald W., 4,586,231, Cl. 29-416.000.
Vancelette, Stanley R.; Hanson, Waldo B.; and Dacey, John W., 4,586,670, Cl. 242-55.000.
Vaghasia, Gordhan K.: *See—*
Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., 4,586,719, Cl. 277-41.000.
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Valentine, Robert H., to Hercules Incorporated. Low density, polybutadiene based, wet filament winding resin. 4,587,300, Cl. 525-95.000.
Valeo: *See—*
Jeanson, Rene H., 4,586,725, Cl. 280-414.100.
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Laapotti, Jorma, 4,586,983, Cl. 162-205.000.
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Van Antwerp, William P.: *See—*
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Van Bodegom, Bertus M.: *See—*
Bodor, Janos; Van Bodegom, Bertus M.; Poot, Cornelis; and Reckweg, Freek, 4,587,131, Cl. 426-603.000.
Vancelette, Stanley R.; Hanson, Waldo B.; and Dacey, John W., to USM Corporation. Tape stripper for electrical component tape feeder. 4,586,670, Cl. 242-55.000.
van de Plassche, Rudy J., to Signetics Corporation. Auto-zero sample and hold circuit. 4,587,443, Cl. 307-353.000.
Vanguard Properties Co.: *See—*
Oberg, Hans, 4,586,612, Cl. 209-555.000.
Van Hout, James E.: *See—*
Mullen, William B., III; Van Hout, James E.; and Bradford, William M., 4,586,764, Cl. 339-17.00M.
Van Roessel, Frederik J., to U.S. Philips Corporation. Pulse generator comprising at least two voltage comparison circuits. 4,587,439, Cl. 307-265.000.

Van Wert, Bernard: *See—*
Gutek, Beth I.; and Van Wert, Bernard, 4,587,159, Cl. 428-251.000.
Varian Associates, Inc.: *See—*
Laudermilch, John R., 4,587,492, Cl. 324-318.000.
Veaux, Jacques; and Derrien, Michel, to Messier-Hispano-Bugatti. Landing gear for an aircraft structure. 4,586,682, Cl. 244-102.00R.
Vepa Aktiengesellschaft: *See—*
Fleissner, Heinz, 4,586,268, Cl. 34-68.000.
Ver-Nor Development Corporation: *See—*
Ginther, Vern, 4,586,404, Cl. 81-3.570.
Verbatim Corp.: *See—*
Brock, George W.; and Hampton, George J., 4,587,157, Cl. 428-216.000.
Verdicchio, Robert J., to Johnson & Johnson Baby Products Company. Antimicrobial compositions. 4,587,266, Cl. 514-635.000.
Vere , Bernard; and Maura, Biryoukoff. Device and method of welding nuclear fuel assembly structural elements. 4,587,394, Cl. 219-67.000.
Verilink Corporation: *See—*
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Shimizu, Shigeo; Kato, Toshio; Oda, Hitoshi; and Shigeta, Masanobu, 4,587,178, Cl. 428-615.000.
Sugiyama, Hiroyuki; Takahashi, Nobuaki; Shibamoto, Takeshi; Sato, Hideo; Amano, Yoshiaki; and Tanaka, Koji, 4,587,558, Cl. 358-160.000.
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Vincent, James H.; Mark, David; Gibson, Harold; and Lynch, Gordon, to Coal Industry (Patents) Limited. Dust detection. 4,586,389, Cl. 73-863.220.
Vine, George: *See—*
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Vio, Lino; and Meunier, Gilles, to Societe Nationale Elf Aquitaine. Preparation of polymers of hydroxamic functions. 4,587,306, Cl. 525-354.000.
Virginia Corporation of Richmond: *See—*
Burkhardt, Frederick R., Jr., 4,586,379, Cl. 73-622.000.
Vitron, William J.: *See—*
Prischak, Joseph J.; Vitron, William J.; and Seaberg, Carl E., 4,586,886, Cl. 425-123.000.
Vocal, Rodolfo S. Hook setter. 4,586,283, Cl. 43-15.000.
Voest-Alpine Aktiengesellschaft: *See—*
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Vogel, Hans-Henning: *See—*
Bronstert, Klaus; Hochstein, Waldhelm; Vogel, Hans-Henning; and Rath, Hans P., 4,587,307, Cl. 525-362.000.
Vogel, Ignaz, to Ignaz Vogel GmbH & Co. KG. Passenger seat with armrests. 4,586,750, Cl. 297-417.000.
Vogeleer, John P.: *See—*
Cooper, Frank W., Jr.; and Vogeleer, John P., 4,586,250, Cl. 29-727.000.
Vogler, Gunther, to Daimler-Benz Aktiengesellschaft. Method and apparatus for determining cylinders operating with irregular combustion of an internal combustion engine. 4,586,369, Cl. 73-117.300.
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Schaffer, Hans-Georg; Vogts, Axel; Poppel, Gunter; and Schurmann, Horst, 4,586,936, Cl. 44-10.00C.
Voith Turbo GmbH & Co. KG: *See—*
Duminy, Jacques, 4,586,594, Cl. 192-103.0FA.
Volk, Heinrich, to Esselte Pendaflex Corporation. Setting means for printer with plural endless bands. 4,586,432, Cl. 101-111.000.
Voll, Gerhard W.; and Weiher, Richard L., to Minnesota Mining and Manufacturing Company. Semi-concentrating solar energy collector. 4,586,489, Cl. 126-438.000.
Volland, Michel; Fourneaux, Roger; and Remond, Pierre, to Saurer Diederichs (Societe Anonyme). Device for the rotational drive of a weft prefeed and measurement apparatus in a shuttle-less weaving machine. 4,586,543, Cl. 139-452.000.
von Rauch, Moriz: *See—*
Pehlgrim, Horst; and von Rauch, Moriz, 4,586,384, Cl. 73-716.000.
von Werner, Konrad, to Hoechst Aktiengesellschaft. Process for preparing fluoroalkyl-substituted iodoalkanes. 4,587,366, Cl. 570-172.000.
Vsesojuzny Nauchno-Issledovatelsky Proektno-Konstruktorsky Institut Atomnogo Energeticheskogo Mashinostroenia: *See—*
Golubev, Evgeny K.; Lensky, Alexandr R.; Glazov, Evgeny E.; Berseniev, Vladimir A.; Vakulenko, Boris F.; Mikhailov, Vasily S.; and Shiryaev, Anatoly A., 4,586,981, Cl. 159-47.100.
W. P. Hickman Company: *See—*
Hickman, John B., 4,586,301, Cl. 52-96.000.
W. Schlafhorst & Co.: *See—*
Wassenhoven, Heinz-Georg, 4,586,325, Cl. 57-263.000.
Waage, Harold: *See—*
Duve, George; Waage, Harold; and Quick, Luther P., 4,587,417, Cl. 250-214.0AL.
Waber, Morris L. Adjustable mobile support for electric drill. 4,586,856, Cl. 408-92.000.
Wada, Keiichiro: *See—*
Hirai, Hidefumi; Komiyama, Makoto; and Wada, Keiichiro, 4,587,114, Cl. 423-247.000.
Wada, Tetsuyoshi: *See—*
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.
Wade, Franklin C.: *See—*
Norman, Robert M.; and Wade, Franklin C., 4,586,850, Cl. 405-163.000.
Waibel, Hans: *See—*
Bauer, Herbert; Waibel, Hans; and Speisebecher, Joachim, 4,586,636, Cl. 222-146.500.
Wainwright, David S.. *See—*
Stiles, James A. R.; Brandt, Klaus; Wainwright, David S.; and Lee, Keith C., 4,587,182, Cl. 429-94.000.
Wajima, Motoyo: *See—*
Nagai, Akira; Takahashi, Akio; Sugawara, Katuo; Ono, Masahiro; Tada, Ritsuro; Wajima, Motoyo; and Narahara, Toshikazu, 4,587,162, Cl. 428-290.000.
Wakabayashi, Masayoshi: *See—*
Kondo, Shuzi; Hirose, Iwao; and Wakabayashi, Masayoshi, 4,586,978, Cl. 156-540.000.
Wakamoto Pharmaceutical Co., Ltd.: *See—*
Toyofuku, Hatsunori; Tsuriya, Yoshihiro; Kuroda, Toshio; Aoki, Hitoshi; and Nagasawa, Hiroshi, 4,587,254, Cl. 514-326.000.
Wake, Kanji: *See—*
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.
Waldemar Link GmbH & Co.: *See—*
Keller, Arnold, 4,586,496, Cl. 128-92.00E.
Waldorf Corporation: *See—*
Webinger, George P., 4,586,649, Cl. 229-114.000.
Walker, Leigh E.; and Ranade, Gautam R., to Occidental Chemical Corporation. Blends of polyolefin-vinyl chloride graft polymers and condensation polymers. 4,587,297, Cl. 525-64.000.
Walker, Walter L.: *See—*
Argoud, Maurice J.; Walker, Walter L.; and Butler, Lloyd V., 4,586,487, Cl. 126-418.000.
Walker, William J.: *See—*
Somerville, Michael J.; Pollard, Ian F.; and Walker, William J., 4,586,893, Cl. 431-76.000.
Wallac Oy: *See—*
Soini, Erkki; Hemmila , Ilkka; and Lovgren, Timo, 4,587,223, Cl. 436-536.000.
Wallace, Barnie A., Jr., to Raychem Corporation. Method of joining heat shrinkable closure members. 4,586,971, Cl. 156-85.000.
Walldorf, Diann, to Affiliated Hospital Products, Inc. Tamper-resistant pharmaceutical vial and cap assembly. 4,586,622, Cl. 215-256.000.
Walter, Keith D.: *See—*
Nelson, Gary A.; Godding, Patrick N.; Schumaker, Richard E.; Walter, Keith D.; Marrone, Edward S.; Gates, Stillman F.; Rigsbee, Everett O., III; and Teener, Michael D., 4,587,651, Cl. 370-88.000.
Walter, Leo; Ring, Charles E.; Seppala, Bryan R.; Kennelly, Patric M.; and Marnie, James P., to BMC Industries, Inc. Compliant pin. 4,586,778, Cl. 339-221.00R.
Walter, Lothar; and Reith, Walter, to SKF Kugellagerfabriken GmbH. Prong-type cage for rolling bearings. 4,586,833, Cl. 384-531.000.
Walters, Wally Z. Method and apparatus for preventing air pollution by the entrainment of particulate material. 4,586,599, Cl. 198-364.000.
Walther, Wolfgang: *See—*
Spielmann, Norbert; Gussbacher, Udo; Walther, Wolfgang; and Bauer, Hermann, 4,586,580, Cl. 180-89.100.
Walton, Charles F., to Smithers-Oasis Company. Tissue culture rooting system. 4,586,288, Cl. 47-73.000.
Wang, An; Fry, Stanley B.; Ho, Shu K.; and Smutek, John M., to Wang Laboratories, Inc. Management communication terminal system. 4,587,633, Cl. 364-900.000.
Wang Laboratories, Inc.: *See—*
Wang, An; Fry, Stanley B.; Ho, Shu K.; and Smutek, John M., 4,587,633, Cl. 364-900.000.
Wang, Samuel S.: *See—*
Nagaraj, D. R.; and Wang, Samuel S., 4,587,013, Cl. 209-167.000.
Warfel, David R.; and Nicholson, Harold L., to Atlantic Richfield Company. Purification of polymer solutions. 4,587,330, Cl. 528-490.000.
Warner-Lambert Company: *See—*
Cherukuri, Subraman R.; Hriscisce, Frank T.; Siecke, Albert E.; and Wei, You C., 4,587,125, Cl. 426-3.000.
Kozlow, Gary W., 4,586,691, Cl. 251-7.000.
Satzinger, Gerhard; Hartenstein, Johannes; Fritschi, Edgar; and Vigelius, Wolf-Dieter, 4,587,263, Cl. 514-553.000.
Smerbeck, Richard V.; and Pittz, Eugene P., 4,587,260, Cl. 514-532.000.

Warner-Lambert Technologies, Inc.: *See*—
Carpenter, George J., 4,586,491, Cl. 128-6.000.

Warner, Robert T.: *See*—
Scolari, John E.; Warner, Robert T.; and Deavenport, Joe E., 4,586,715, Cl. 273-311.000.

Warren, Bob E. Vehicle warning system. 4,587,522, Cl. 340-902.000.

Warter, Peter J.: *See*—
Dill, Frederick H.; Gupta, Satish; and Warter, Peter J., 4,587,629, Cl. 364-900.000.

Wassenhoven, Heinz-Georg, to W. Schlafhorst & Co. Method and device for piecing on a thread in friction spinning machines. 4,586,325, Cl. 57-263.000.

Watanabe, Akira: *See*—
Matsui, Tatsuhiko; Aida, Hiroyuki; Watanabe, Akira; and Oohazama, Tsuneyoshi, 4,586,579, Cl. 180-69.210.

Watanabe, Hiroshi; Izumi, Eiki; Aoyagi, Yukio; Honma, Kazuo; and Nakajima, Kichio, to Hitachi Construction Machinery Co., Ltd. Control system for hydraulic circuit apparatus. 4,586,330, Cl. 60-421.000.

Watanabe, Junji: *See*—
Tanimoto, Yasufumi; Watanabe, Junji; and Sogo, Toshiyuki, 4,586,808, Cl. 355-8.000.

Watanabe, Kiyohiko; Hattori, Yoshiyuki; Matsui, Kazuma; Takei, Toshihiro; Nakamura, Toshiaki; and Ohnishi, Syunsaku, to Nippondenso Co., Ltd. Electric fuel pump device. 4,586,877, Cl. 417-365.000.

Watanabe, Masaki; Yagasaki, Akio; and Matsuoka, Yoshinori, to Honda Giken Kogyo Kabushiki Kaisha. All-wheel-steerable vehicle. 4,586,722, Cl. 280-103.000.

Watanabe, Minoru: *See*—
Kyoto, Michihisa; Yoshioka, Naoki; Tanaka, Gotaro; Watanabe, Minoru; Shimba, Hiroshi; and Inagaki, Nobuo, 4,586,943, Cl. 65-3.120.

Watanabe, Tomonari: *See*—
Fukuoka, Shinsuke; and Watanabe, Tomonari, 4,587,056, Cl. 260-453.0PC.

Watanabe, Toshiro; and Ohkoshi, Akio, to Sony Corporation. Apparatus for displaying images wtih reduced coarseness. 4,587,553, Cl. 358-64.000.

Watanabe, Tsugio: *See*—
Hara, Kenji; Nagahori, Yukihiro; Watanabe, Tsugio; Itoh, Akio; and Izumi, Hikoshi, 4,586,838, Cl. 400-320.000.

Watanabe, Yoshihiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Automatic depositing/dispensing apparatus. 4,587,408, Cl. 235-379.000.

Watanabe, Yoshihiro: *See*—
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Suzuki, Tadashi, 4,587,402, Cl. 219-343.000.

Watanabe, Yoshio: *See*—
Emori, Shinji; and Watanabe, Yoshio, 4,587,444, Cl. 307-355.000.
Ono, Tetsuo; Watanabe, Yoshio; Matsuno, Hiromitsu; Kato, Yasuo; Murayama, Seiichi; and Mikoshiba, Shigeo, 4,587,453, Cl. 313-25.000.

Watanabe, Yoshitaka, to Canon Kabushiki Kaisha. Liquid jet apparatus with pressure sensor for indicating absence/presence of liquid. 4,587,535, Cl. 346-140.00R.

Watari, Yoshio, to Hitachi, Ltd. Nuclear fuel assembly. 4,587,091, Cl. 376-434.000.

Water Research Centre: *See*—
Wolinski, Waldemar K., 4,587,019, Cl. 210-608.000.

Watercraft Limited: *See*—
Wilks, Thomas M.; and Pope, Simon P. K., 4,586,453, Cl. 114-368.000.

Watermann, Willy, to Kloeckner-Becorit GmbH. Levelling ram for roof-shield mine support systems. 4,586,851, Cl. 405-295.000.

Watson, Stuart L., Jr.; and Humphreys, Gordon R., to Union Carbide Corporation. Method of using mixed aliphatic/aromatic polycarbodiimides. 4,587,301, Cl. 525-123.000.

Weaver, John R., II; and McClure, Nathaniel D., to General Motors Corporation. Method for more uniformly spacing features in a semiconductor monolithic integrated circuit. 4,586,243, Cl. 29-578.000.

Webb, Dale P., to Webb Manufacturing, Inc. Window assembly and grille retaining strip hardware therefor. 4,586,306, Cl. 52-311.000.

Webb Manufacturing, Inc.: *See*—
Webb, Dale P., 4,586,306, Cl. 52-311.000.

Webb, Paul P., to RCA Inc. Avalanche photodetector. 4,587,544, Cl. 357-30.000.

Weber, Eckard: *See*—
Barchas, Jack D.; Weber, Eckard; Evans, Christopher J.; Wei, E. T.; Chang, J. K.; Fuchs, Ingbert; and Mues, Gabriele, 4,587,233, Cl. 514-15.000.

Weber, Ralph; and Rothe, Herbert, to Kortec AG; and Korf-BSW-Engineering GmbH. Installation including a heating furnace for continuous castings, which are cut to length, from a continuous casting installation. 4,586,897, Cl. 432-121.000.

Webinger, George P., to Waldorf Corporation. Food package. 4,586,649, Cl. 229-114.000.

Wedertz, Larry D.; Leslie, David L.; and Karish, John A., to General Dynamics Pomona Division. Supersonic erectable fabric wings. 4,586,681, Cl. 244-49.000.

Weed Instruments Co., Inc.: *See*—
Oskoui, Rayyaneh M., 4,586,246, Cl. 29-612.000.

Week, Kenneth R., Jr.: *See*—
Yau, Leopoldo D.; Gasser, Robert A., Jr.; Week, Kenneth R., Jr.; Yu, Jick M.; and Chin, David D., 4,587,138, Cl. 427-88.000.

Weeks, Glenn E.: *See*—
Winters, Simon N.; and Chu, Yiu T., 4,586,711, Cl. 273-138.00R.

Wehrli, Felix W., to General Electric Company. Method for rapid acquisition of NMR data. 4,587,489, Cl. 324-309.000.

Wei, E. T.: *See*—
Barchas, Jack D.; Weber, Eckard; Evans, Christopher J.; Wei, E. T.; Chang, J. K.; Fuchs, Ingbert; and Mues, Gabriele, 4,587,233, Cl. 514-15.000.

Wei, You C.: *See*—
Cherukuri, Subraman R.; Hriscisce, Frank T.; Siecke, Albert E.; and Wei, You C., 4,587,125, Cl. 426-3.000.

Weigel, David C.: *See*—
Ishida, Takuzo; and Weigel, David C., 4,587,211, Cl. 430-619.000.

Weigel, Leland O.: *See*—
Atkins, Randall K.; and Weigel, Leland O., 4,587,351, Cl. 549-333.000.

Weiher, Richard L.: *See*—
Voll, Gerhard W.; and Weiher, Richard L., 4,586,489, Cl. 126-438.000.

Weil, Edward D.: *See*—
Honig, Milton L.; and Weil, Edward D., 4,587,362, Cl. 564-013.000.

Weil, George, to David R. Webb Co., Inc. Control system for veneer slicer. 4,587,616, Cl. 364-475.000.

Weilerstein, I. Marvin: *See*—
Dreibelbis, John D.; and Weilerstein, I. Marvin, 4,586,642, Cl. 228-4.500.

Weimann, George F., to Stanley Works, The. Knife handle. 4,586,256, Cl. 30-162.000.

Weisberg, Sharon L.: *See*—
Murray, Alexander P.; Weisberg, Sharon L.; and Becker, Lawrence F., Jr., 4,587,043, Cl. 252-626.000.

Weiss, Stefan; and Krommer, Helmut, to SKW Trostberg Aktiengesellschaft. Process for the preparation of 2-amino-s-triazines. 4,587,337, Cl. 544-194.000.

Welch Allyn, Inc.: *See*—
Longacre, Andrew, Jr.; and Sarofeen, Joseph J., 4,587,559, Cl. 358-160.000.

Welding Institute, The: *See*—
Oakley, Peter J.; Stockham, Norman R.; and Miller, Heidi M., 4,587,395, Cl. 219-121.0LD.

Welker, Helmut, to Bausch & Lomb Incorporated. Measuring scale casing and mounting spar. 4,586,760, Cl. 312-245.000.

Weller, Harold N., III: *See*—
Gordon, Eric M.; and Weller, Harold N., III, 4,587,234, Cl. 514-19.000.

Welles, Petrus W. G.: *See*—
Doornhein, Laurens; Raven, Johannes G.; Welles, Petrus W. G.; Annegarn, Marcellinus J. J. C.; and Nillesen, Antonius H. H. J., 4,587,557, Cl. 358-140.000.

Wen-Kuei Lee: *See*—
Chen, Yu-Chuan, 4,586,706, Cl. 272-73.000.

Werkzeugmaschinenfabrik, Oerlikon-Buhrle AG: *See*—
Stauffacher, Werner, 4,586,423, Cl. 89-35.020.

Werner, Konrad: *See*—
Agerley, Jorgen; and Werner, Konrad, 4,586,464, Cl. 119-72.500.

Werner Lehara, Inc.: *See*—
Anderson, Joseph R., 4,586,888, Cl. 425-362.000.

Werner Turck GmbH & Co., KG: *See*—
Soyck, Gerno, 4,587,486, Cl. 324-236.000.

West, John G. W., to Lucas Industried Limited. Permanent magnet rotary dynamo electric machine. 4,587,449, Cl. 310-154.000.

Western Gear Corporation: *See*—
Carter, William; and Carpenter, Gary, 4,586,684, Cl. 244-137.00R.

Westfalia Separator AG: *See*—
Icking, Friedrich, 4,586,462, Cl. 119-14.100.

Westgerdes, James J., to Fort Recovery Industries, Inc. Sink strainer assembly. 4,586,203, Cl. 4-287.000.

Westinghouse Electric Corp.: *See*—
Ahmed, Hassan J.; and Fogg, James L., 4,587,407, Cl. 235-467.000.
Bucher, George D., 4,587,094, Cl. 376-451.000.
Cooper, Frank W., Jr.; and Vogeleer, John P., 4,586,250, Cl. 29-727.000.
Costlow, Annette M.; Chizmar, David A.; and Cooper, Frank W., 4,586,249, Cl. 29-723.000.
Dirnberger, Linus R.; Husson, Alan L.; and Brick, Michael J., 4,587,511, Cl. 340-19.00R.
Goldberg, Newton N., 4,587,328, Cl. 528-299.000.
Johnson, Forrest T., 4,587,080, Cl. 376-282.000.
Leumann, Hans E., 4,586,266, Cl. 33-531.000.
Murray, Alexander P.; Weisberg, Sharon L.; and Becker, Lawrence F., Jr., 4,587,043, Cl. 252-626.000.
Radford, Kenneth C.; and Parks, Beryl H., 4,587,087, Cl. 376-417.000.
Radford, Kenneth C., 4,587,088, Cl. 376-419.000.
Yannopoulos, Lymperios N., 4,587,104, Cl. 422-94.000.

Westwood, Samuel M., III. Fishing line signal. 4,586,284, Cl. 43-17.000.

Wetegrove, Robert L.: *See*—
Srivatsa, Sanjay R.; Wetegrove, Robert L.; and Patzelt, Robert R., 4,587,023, Cl. 210-744.000.

Wetzel, Robert E.: *See*—
Marsh, Richard L.; and Wetzel, Robert E., 4,586,973, Cl. 156-140.000.

Weyerhaeuser Company: *See*—
Halabisky, Donald D.; and Dudley, Dwight A., II, 4,586,643, Cl. 229-3.100.

Wheeler, Alfred P.; and Sikes, C. Steven, to University of South Alabama. Inhibition of the formation of inorganic or biological $CaCO_3$-

containing deposits by a proteinaceous fraction obtained from $CaCO_3$-forming organisms. 4,587,021, Cl. 210-698.000.

Wheeler, James E.: *See*—
Hammonds, James W.; and Wheeler, James E., 4,586,844, Cl. 403-287.000.

Wheelock, Kenneth S., to Exxon Research and Engineering Co. Hydrocarbon hydrogenation with thermally stable mixed titanium oxide gels. 4,587,009, Cl. 208-111.000.

White, James W.; and Griffiths, Brian J., to Dow Corning Ltd. Curable organopolysiloxane compositions. 4,587,136, Cl. 427-54.100.

White, Neil D., to Kawite Packaging Pty. Ltd. Vacuum filling machines. 4,586,549, Cl. 141-67.000.

White, Roger N., to Kendall Company, The. Disposable surgical gown. 4,586,196, Cl. 2-114.000.

White-Stevens, Rodric H.: *See*—
Mayambala-Mwanika, Christine; and White-Stevens, Rodric H., 4,587,220, Cl. 436-66.000.

Wich, Thomas J., to United Technologies Diesel Systems, Inc. Solenoid valve, particularly as bypass valve with fuel injector. 4,586,656, Cl. 239-88.000.

Wico Corporation: *See*—
Kim, Syng N., 4,587,419, Cl. 250-221.000.
Kim, Syng N., 4,587,510, Cl. 338-128.000.

Widlar, Robert J., to National Semiconductor Corporation. Quasi-complementary class B IC output stage. 4,587,494, Cl. 330-273.000.

Widunas, Joseph T.: *See*—
Mezei, Louis M.; Reeves, Richard W.; Leath, Richard A.; and Widunas, Joseph T., 4,586,546, Cl. 141-2.000.

Wiechert, Rudolf: *See*—
Annen, Klaus; Petzoldt, Karl; Laurent, Henry; Wiechert, Rudolf; and Hofmeister, Helmut, 4,587,236, Cl. 514-179.000.
Bittler, Dieter; Laurent, Henry; Nickisch, Klaus; and Wiechert, Rudolf, 4,587,235, Cl. 514-178.000.

Wied, Julius P., deceased (by Dean, Forrest S., administrator), to Lucerne Products, Inc. Battery-switch module adapter. 4,586,777, Cl. 339-154.00A.

Wiese, Winfred J.: *See*—
Marsi, Joseph A.; Wiese, Winfred J.; Takumi, Lawrence I.; Boster, Clark S.; Vaghasia, Gordhan K.; Ellison, Jerel E.; and Coleman, Alan B., 4,586,719, Cl. 277-41.000.

Wiggins Teape Group Limited, The: *See*—
Shanton, Kenneth J.; and Azizian, Farid, 4,587,538, Cl. 346-218.000.

Wilke, Myron A. W.: *See*—
Hagan, James A.; Maloy, James E.; and Wilke, Myron A. W., 4,587,139, Cl. 427-130.000.

Wilkinson, James. Dispersion of poly(ethylene tetrafluoroethylene). 4,587,286, Cl. 524-375.000.

Wilks, Thomas M.; and Pope, Simon P. K., to Watercraft Limited. Launching apparatus for boats. 4,586,453, Cl. 114-368.000.

Williams, Charles F.; and Sahni, Atam P., to Ferro Corporation. Electrostatically conductive premold coating. 4,587,160, Cl. 428-288.000.

Williams, Donald H.; and Jones, LeRoy, Sr., to Consolidated Papers, Inc. Corrugated carton separator. 4,586,916, Cl. 493-10.000.

Williams, John C.: *See*—
Crowley, Patrick J.; and Williams, John C., 4,586,947, Cl. 71-76.000.

Williams, Terrance L.: *See*—
Lat, Geronimo E.; and Williams, Terrance L., 4,587,173, Cl. 428-457.000.

Willigman, John, to Controls Company of America. Snap action timer switch assembly. 4,587,389, Cl. 200-153.0LB.

Wilman, John G.: *See*—
Ho, Cecil T.; and Wilman, John G., 4,587,464, Cl. 315-382.000.

Wilt, Mason S., to Phillips Petroleum Company. Continuous polymerization reactor. 4,587,314, Cl. 526-88.000.

Windows, Inc.: *See*—
Swan, Charles A., 4,586,291, Cl. 49-501.000.

Winkelman, John H.: *See*—
Taipale, Dale L.; Winkelman, John H.; and Adams, Thomas P., 4,586,522, Cl. 133-3.00E.

Winkler & Dunnebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG: *See*—
Ehlscheid, Gunter; and Munsch, Klaus, 4,586,598, Cl. 198-356.000.

Winkles, Billy B.: *See*—
Roes, John B.; Winkles, Billy B.; Kelly, Guy M.; Spani, Wayne M.; and Schuster, Donaid W., 4,587,434, Cl. 250-556.000.

Winter, Janos; and Lichtenberg, Jesper, to Danfoss A/S. Measuring device for detecting a liquid component in refrigerant. 4,586,828, Cl. 374-16.000.

Winter, Roland A. E.; and Detlefsen, Robert E., to Ciba-Geigy Corporation. Liquid 2-(2-hydroxy-3-higher branched alkyl-5-methylphenyl)-2H-benzotriazole mixtures, stabilized compositions and processes for preparing liquid mixtures. 4,587,346, Cl. 548-260.000.

Winters, Simon N.; and Chu, Yiu T., to Weeks, Glenn E., a part interest. Matching card game employing randomly-coded monochromatic images. 4,586,711, Cl. 273-138.00R.

Wisakowsky, Eugene E.: *See*—
Patton, James C.; Bennet, Richard G.; Kasper, Dean J.; and Wisakowsky, Eugene E., 4,587,126, Cl. 426-19.000.

Wisniak, Jaime, to Negev Jojoba. Extractant compositions containing dialkyl and diaryl phosphonate derivatives and methods for the use thereof. 4,587,107, Cl. 423-10.000.

Witchger, Eugene S. Accelerating means and method for turbocharger. 4,586,878, Cl. 417-407.000.

Witler, James L.: *See*—
Talbot, Douglas C.; and Witler, James L., 4,587,427, Cl. 250-339.000.

Witthaus, Martin: *See*—
Kruse, Hans; Witthaus, Martin; Altenschopfer, Theodor; and Schumann, Klaus, 4,587,031, Cl. 252-135.000.

Wittkus, Heinz: *See*—
Hille, Martin; Friede, Wolfgang; Wittkus, Heinz; Engelhardt, Friedrich; and Riegel, Ulrich, 4,587,283, Cl. 524-3.000.

Wochnowski, Waldemar, to Hauni-Werke Korber & Co. KG. Method and apparatus for ascertaining the filling power of tobacco. 4,586,517, Cl. 131-84.100.

Woelfel, Werner: *See*—
Barthelmes, Norbert; and Woelfel, Werner, 4,587,471, Cl. 318-628.000.

Wogerer, Wolfgang, to Voest-Alpine Aktiengesellschaft. Apparatus for feeding platelike workpieces to a tool station of a machine tool. 4,586,597, Cl. 198-345.000.

Wolaver, Dan H., to General Signal Corporation. Fast acquisition phase-lock loop. 4,587,496, Cl. 331-1.00A.

Wolf, Wolfram, to E.C.H. Will (GmbH & Co.). Apparatus for introducing stacks of paper layers into cartons. 4,586,315, Cl. 53-447.000.

Wolinski, Waldemar K., to Water Research Centre. Aerobic digestion of sludge. 4,587,019, Cl. 210-608.000.

Womack, James A.: *See*—
Long, Jerry M.; and Womack, James A., 4,586,603, Cl. 206-45.180.

Won, Yong K., to Ben Clements & Sons, Inc. Tag pin fastener assembly and method. 4,586,609, Cl. 206-343.000.

Wong, Patrick S. L.: *See*—
Edgren, David; Wong, Patrick S. L.; and Theeuwes, Felix, 4,587,117, Cl. 424-15.000.

Wong, Walter; Abrams, Robert; Nagl, Alan; and Repphun, William, to MiniScribe Corporation. Disc drive assembly. 4,587,645, Cl. 369-75.100.

Wood, Nicholas S., to Imperial Chemical Industries PLC. Electrolytic cell with low hydrogen overvoltage cathode. 4,586,998, Cl. 204-252.000.

Woodley, George M.: *See*—
King, James L.; and Woodley, George M., 4,586,672, Cl. 242-56.00R.

Woods, Ralph A. A.: *See*—
Finnegan, Walter D.; and Woods, Ralph A. A., 4,586,964, Cl. 148-11.50A.

Worbois, Robert J., to American Standard Inc. Railway brake control system arranged to limit maximum brake pressure during combined independent and automatic brake operation. 4,586,755, Cl. 303-28.000.

Worley, Richard C.: *See*—
DiTommaso, Anthony; Inglis, Ronald T.; Worley, Richard C.; and Renda, Ramon J., 4,586,680, Cl. 244-3.270.

Worsoe-Schmidt, Peder: *See*—
Friberg, Svend; Korsgaard, Peter; and Worsoe-Schmidt, Peder, 4,586,345, Cl. 62-235.100.

Wrana, Josef B. V., to U.S. Philips Corporation. Cartridge for launching decoys. 4,586,439, Cl. 102-438.000.

Wright State University: *See*—
Glaser, Roger M.; Glaser, Marcus; Collins, Steven R.; and Strayer, Jonathan R., 4,586,510, Cl. 128-423.00W.
Petrofsky, Jerrold S., 4,586,495, Cl. 128-82.100.

Wrobel, Keith A., to LSI Corporation of America, Inc. Modular framing and support system for laboratory furniture. 4,586,759, Cl. 312-198.000.

WS Warmeprozesstechnik GmbH: *See*—
Wunning, Joachim, 4,586,894, Cl. 431-158.000.

Wu, Chun-San. Universal clamping device for dial indicators. 4,586,221, Cl. 24-535.000.

Wu, Maan-shii S., to Minnesota Mining and Manufacturing Company. Directly printable pressure-sensitive adhesive tape. 4,587,156, Cl. 428-207.000.

Wu, Wen-Pao: *See*—
Krutchen, Charles M.; and Wu, Wen-Pao, 4,587,271, Cl. 521-60.000.

Wuest, Willi: *See*—
Harth, Hubert; Wuest, Willi; Bruhn, Hans-Athanas; Danielisz, Miklos; and Heinrich, Erbo, 4,587,059, Cl. 558-464.000.

Wunning, Joachim, to WS Warmeprozesstechnik GmbH. Industrial burner for gaseous or liquid fuels. 4,586,894, Cl. 431-158.000.

Wynn, Nicholas P., to Sulzer Brothers Limited. Method of liquid-liquid extraction of gallium from a basic aqueous solution. 4,587,111, Cl. 423-112.000.

X-Cel X-Ray Corporation: *See*—
Morris, William W., 4,587,668, Cl. 378-197.000.

Xerox Corporation: *See*—
Hor, Ah-Mee; and Loutfy, Rafik O., 4,587,189, Cl. 430-59.000.
Mak, David W.; and Branson, Terry L., 4,587,647, Cl. 369-270.000.
Smith, Charles E., 4,586,640, Cl. 227-14.000.

Yacobi, Michael S., to Black & Decker, Inc. Sub-assembly for electric motor including reversing switch. 4,587,384, Cl. 200-1.00V.

Yagasaki, Akio: *See*—
Watanabe, Masaki; Yagasaki, Akio; and Matsuoka, Yoshinori, 4,586,722, Cl. 280-103.000.

Yagi, Hiroshi; Harada, Yoshio; and Ito, Tetsuro, to TDK Corporation. Device for cutting and bending lead wires. 4,586,544, Cl. 140-105.000.

Yamada, Keiichi: *See*—
Kobayashi, Masayoshi; Nozaki, Shinya; Yamada, Keiichi; and Kobayashi, Tadashi, 4,586,480, Cl. 123-506.000.

Yamada, Kiyoshi: *See*—
Samejima, Yasushi; Shiga, Minoru; Kano, Toshiji; Yamada, Kiyoshi; and Nishio, Tsutomu, deceased, 4,586,994, Cl. 204-98.000.
Yamada, Noboru: *See*—
Ohno, Eiji; Kimura, Kunio; Yamada, Noboru; and Akahira, Nobuo, 4,587,209, Cl. 430-526.000.
Yamada, Ryoji: *See*—
Miyake, Haruhisa; Ito, Hiroaki; Suzuki, Koji; and Yamada, Ryoji, 4,586,992, Cl. 204-98.000.
Yamaguchi, Sadaatsu: *See*—
Nakagawa, Shinichi; Nakagawa, Tsuneo; Amano, Toshihiko; Omori, Mitsugu; Yamaguchi, Sadaatsu; and Asano, Kozo, 4,587,316, Cl. 526-247.000.
Yamakawa, Toru; Makita, Fujio; Umezawa, Mitsuo; and Sakakiyama, Ryuzo, to Fuji Jukogyo Kabushiki Kaisha. System for controlling a power transmission of a four-wheel drive vehicle. 4,586,583, Cl. 180-247.000.
Yamamori, Eiji; and Suzuki, Hiroyuki, to Sony Corporation. Flat picture tube television receiver including picture tube mounting structure. 4,587,567, Cl. 358-248.000.
Yamamoto, Hiroshi: *See*—
Sasaki, Yutaka; Nakamura, Toshio; Yamamoto, Hiroshi; Murata, Hiroshi; Nakamura, Yoshimi; and Takahashi, Naohiro, 4,587,226, Cl. 502-5.000.
Yamamoto, Kaoru: *See*—
Inoue, Takashi; Miyoshi, Mituji; Matsuura, Kazuo; and Yamamoto, Kaoru, 4,587,318, Cl. 526-282.000.
Yamamoto, Masanao: *See*—
Inoue, Eisuke; Nonaka, Yasuhiko; and Yamamoto, Masanao, 4,587,456, Cl. 313-366.000.
Yamamoto, Mikio: *See*—
Noguchi, Matsusaburo; Yamamoto, Mikio; and Furukawa, Shinichi, 4,586,461, Cl. 118-663.000.
Yamamoto, Ryoji: *See*—
Iizuka, Kinji; Kamijo, Tetsuhide; Yamamoto, Ryoji; and Harada, Hiromu, 4,587,356, Cl. 562-455.000.
Yamamoto, Ryuichi; and Nojiri, Hironobu, to Toray Industries, Inc. Yarn package of carbon filament yarn. 4,586,679, Cl. 242-176.000.
Yamamoto, Yoshiyuki: *See*—
Tanaka, Chiaki; Kondou, Makoto; and Yamamoto, Yoshiyuki, 4,587,309, Cl. 525-419.000.
Yamanoi, Hiroshi: *See*—
Uedaira, Satoru; Yamanoi, Hiroshi; and Tamura, Hidemasa, 4,587,041, Cl. 252-572.000.
Yamaoka, Noboru; Kezuka, Seiju; Iida, Moriya; Miyoshi, Mituji; and Matsuura, Kazuo, to Nippon Oil Company, Limited. Electrically-conductive resin composition. 4,587,039, Cl. 252-511.000.
Yamasaki, Katsuhisa. Drilling screw. 4,586,862, Cl. 411-387.000.
Yamashita, Junichi: *See*—
Mochida, Takaaki; and Yamashita, Junichi, 4,587,090, Cl. 376-428.000.
Yamashita, Kimihiro: *See*—
Nicholson, Patrick S.; and Yamashita, Kimihiro, 4,586,991, Cl. 204-61.000.
Yamashita, Shinichi: *See*—
Tomoda, Toshimasa; Fukakusa, Shinji; and Yamashita, Shinichi, 4,587,429, Cl. 250-375.000.
Yamashita, Shoichi: *See*—
Agatahama, Shunichi; and Yamashita, Shoichi, 4,587,501, Cl. 335-80.000.
Yamauchi, Takahiko: *See*—
Aoyama, Keizo; Seki, Teruo; and Yamauchi, Takahiko, 4,587,639, Cl. 365-200.000.
Yamawaki, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Multiplex control system. 4,587,470, Cl. 318-564.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Photoelectric conversion device manufacturing method. 4,586,241, Cl. 29-572.000.
Yamazaki, Shunpei. Printing member for electrostatic photocopying. 4,587,187, Cl. 430-57.000.
Yanada, Tetsunosuke: *See*—
Nakane, Yasuaki; Kitagawa, Masataka; Kiyomiya, Tadashi; and Yanada, Tetsunosuke, 4,587,533, Cl. 346-135.100.
Yanagi, Kenichi: *See*—
Shimozato, Yoshio; Wada, Tetsuyoshi; Yanagi, Kenichi; Kato, Mitsuo; Furukawa, Heizaburo; Wake, Kanji; Morita, Arihiko; Tsukiji, Norio; Aiko, Takuya; Kittaka, Toshiharu; and Nakanishi, Yasuji, 4,587,134, Cl. 427-10.000.
Yang, Sung M., to GTE Lenkurt Incorporated. Echo canceller using end delay measurement. 4,587,382, Cl. 179-170.200.
Yang, Sze C.; and Durand, Richard R., Jr., to Board of Governors for Higher Education, State of Rhode Island; and Providence Plantations. Electronic display element. 4,586,792, Cl. 350-357.000.
Yannopoulos, Lymperios N., to Westinghouse Electric Corp. Semiconductor oxide gas combustibles sensor. 4,587,104, Cl. 422-94.000.
Yasuda, Makoto: *See*—
Murayama, Seiichi; Yasuda, Makoto; Miyashita, Tsune; Arai, Yoji; Kawasumi, Kenichi; and Kinoshita, Kazunori, 4,587,460, Cl. 315-174.000.
Yasuda, Yukio: *See*—
Nagatomo, Shigeru; Yasuda, Yukio; Masuda, Nobuhito; Makiuchi, Hajime; and Okazaki, Masaki, 4,587,102, Cl. 422-56.000.
Yasui, Kazuomi: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Shiokawa, Kozo; Morishima, Norihisa; and Goto, Toshio, 4,586,951, Cl. 71-92.000.
Yasuji, Ohtsuka: *See*—
Kouichi, Maeda; Masaaki, Funaki; Motoaki, Yoshida; and Yasuji, Ohtsuka, 4,587,065, Cl. 264-1.500.
Yasumori, Akiyoshi: *See*—
Kubo, Keishi; Miyashita, Takaaki; and Yasumori, Akiyoshi, 4,586,811, Cl. 355-14.00R.
Yatsuda, Yuji; Hagiwara, Takaaki; Kondo, Ryuji; Minami, Shinichi; and Itoh, Yokichi, to Hitachi, Ltd. Method of manufacturing field-effect transistors utilizing self-aligned techniques. 4,586,238, Cl. 29-571.000.
Yau, Leopoldo D.; Gasser, Robert A., Jr.; Week, Kenneth R., Jr.; Yu, Jick M.; and Chin, David D., to Intel Corporation. MOS rear end processing. 4,587,138, Cl. 427-88.000.
Yen, Robert C.: *See*—
Guha, Probir K.; Iseler, Kenneth A.; and Yen, Robert C., 4,587,280, Cl. 523-222.000.
Yeomans, Michael: *See*—
Connell, Peter P. R.; and Yeomans, Michael, 4,587,483, Cl. 324-79.00R.
Yetter, Harold H.: *See*—
Carroll, Thomas A.; and Yetter, Harold H., 4,586,292, Cl. 51-2.00R.
Yindra, Leonard J., to Hamilton Industries. Foot control assembly for power-operated tables and the like. 4,586,398, Cl. 74-512.000.
Yokocho, Yoetsu; and Tanaka, Hiroyuki, to Kioritz Corporation. Grass trimmer. 4,586,322, Cl. 56-12.700.
Yokoi, Katsuyuki: *See*—
Saito, Akio; Aoki, Seiichi; Inamoto, Tadayoshi; Yokoi, Katsuyuki; and Ikeda, Masami, 4,587,534, Cl. 346-140.00R.
Yokono, Hitoshi: *See*—
Kojima, Mithumasa; Kataoka, Fumio; Shoji, Fusaji; and Yokono, Hitoshi, 4,587,197, Cl. 430-196.000.
Yokotani, Yoichirou; Kato, Junichi; Nishida, Masamitsu; Ouchi, Hiromu; and Nitta, Tsuneharu, to Matsushita Electric Industrial Co., Ltd. Method for making multilayer ceramic body. 4,586,972, Cl. 156-89.000.
Yokoyama, Issei; and Hara, Kiyoaki, to Horiba, Ltd. Apparatus for measuring anisotropy of light emitted from the sample. 4,586,820, Cl. 356-317.000.
Yokoyama, Kazumasa: *See*—
Kagitani, Yoshio; Ueda, Yasuo; Munechika, Kozi; Morimoto, Satoshi; Komeda, Shirou; Tanaka, Kenji; and Yokoyama, Kazumasa, 4,587,122, Cl. 424-101.000.
Yoneda, Toshihiro: *See*—
Tokuno, Masateru; Sawada, Tetsuya; Hoshiyama, Hidetoshi; and Yoneda, Toshihiro, 4,586,434, Cl. 101-178.000.
Yoneyama, Takashi: *See*—
Hanai, Kazuko; Yoneyama, Takashi; and Ito, Toshihisa, 4,587,170, Cl. 428-425.900.
York, Billie M., Jr.: *See*—
DeSantis, Louis M.; deFaller, Joseph M.; and York, Billie M., Jr., 4,587,257, Cl. 514-392.000.
Yoshida Industry Co., Ltd.: *See*—
Hatakeyama, Yoshiharu; and Kikuma, Yosiro, 4,586,623, Cl. 215-301.000.
Yoshida, Katsusuke: *See*—
Muraguchi, Yutaka; Yoshida, Katsusuke; and Shiraishi, Shoichi, 4,586,864, Cl. 414-433.000.
Yoshida Kogyo K. K.: *See*—
Ogura, Toyosaku; and Nishino, Seiji, 4,586,220, Cl. 24-433.000.
Yoshida, Toshio: *See*—
Nishizawa, Tetuo; Asano, Seiji; Ishiguro, Minoru; Komori, Masanoshin; Tobioka, Takashi; Yoshida, Toshio; and Hara, Hiroshi, 4,586,801, Cl. 354-173.100.
Yoshihira, Yukiteru: *See*—
Hara, Mitsunori; Yoshihira, Yukiteru; and Furuhashi, Toshiro, 4,587,180, Cl. 429-8.000.
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, to Mitsubishi Kinzoku Kabushiki Kaisha. Super heatresistant cermet and process of producing the same. 4,587,095, Cl. 419-13.000.
Yoshimura, Hironori; Ito, Naohisa; Nishigaki, Kenichi; and Anzai, Katsunori, to Mitsubishi Kinzoku Kabushiki Kaisha. Tungsten cermet. 4,587,174, Cl. 428-552.000.
Yoshino Kogyosho Co., Ltd.: *See*—
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, 4,586,891, Cl. 425-526.000.
Ichizawa, Yoshiyuki; Nomoto, Tsugio; and Oshida, Mamoru, 4,586,892, Cl. 425-531.000.
Yoshino, Shin'ichi: *See*—
Shoji, Hiromu; and Yoshino, Shin'ichi, 4,586,933, Cl. 623-20.000.
Yoshioka, Naoki: *See*—
Kyoto, Michihisa; Yoshioka, Naoki; Tanaka, Gotaro; Watanabe, Minoru; Shimba, Hiroshi; and Inagaki, Nobuo, 4,586,943, Cl. 65-3.120.
Young, Frank R.: *See*—
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Herbst, Desra N., Jr.; Mudge, Ronald K.; Smith, Richard L.; and Young, Frank R., 4,587,619, Cl. 364-552.000.
Young, Ian R., to Picker International, Limited. Nuclear magnetic resonance methods and apparatus. 4,587,488, Cl. 324-306.000.
Yu, Jick M.: *See*—
Yau, Leopoldo D.; Gasser, Robert A., Jr.; Week, Kenneth R., Jr.; Yu, Jick M.; and Chin, David D., 4,587,138, Cl. 427-88.000.

Yuasa, Hitoshi; Matsuno, Mitsuo; and Imai, Hirosuke, to Nippon Oil Co., Ltd. β-Hydroxycyclopentylperoxide compounds and the use thereof. 4,587,057, Cl. 260-453.000.

Yuasa, Kazuhiro, to Ricoh Company, Ltd. Transfer-type electrostatic recording method. 4,586,807, Cl. 355-3.0BE.

Zachariades, Anagnostis E. Preparation of ultra high molecular weight polyethylene morphologies of totally fused particles with superior mechanical performance. 4,587,163, Cl. 428-292.000.

Zaner, Leonard A. Longitudinally extensible stringer and stairway. 4,586,585, Cl. 182-97.000.

Zanzucchi, Paul, to Gould Inc. Optical fiber magnetometer for measuring D.C. and low frequency fields. 4,587,487, Cl. 324-244.000.

Zapolin, Richard E.: *See*—
Bala, John L.; McCarron, Michael; and Zapolin, Richard E., 4,587,590, Cl. 361-94.000.

Zasio, John J., to Storage Technology Partners. Delay testing method for CMOS LSI and VLSI integrated circuits. 4,587,480, Cl. 324-73.00R.

Zatezalo, John M., to Industrial Maintenance Systems, Inc. Methods for measuring alignment of coupled shafts. 4,586,264, Cl. 33-412.000.

Zauer, Karoly: *See*—
Lempert, Karoly; Bartha, Ferenc; Doleschall, Gabor; Fetter, Jozsef; Hornyak, Gyula; Nyitrai, Jozsef; Siming, Gyula; and Zauer, Karoly, 4,587,049, Cl. 260-239.00A.

Zehner, Peter: *See*—
Hartig, Jurgen; Schuch, Gunter; Stoessel, Armin; Herrmann, Guenter; Brunner, Arthur; Zehner, Peter; and Grosskinsky, Otto-Alfred, 4,587,363, Cl. 568-357.000.

Zeigler, John M.: *See*—
Harrah, Larry A.; and Zeigler, John M., 4,587,205, Cl. 430-326.000.

Zekich, Michael B., to Related Energy & Security Systems, Inc. Security system for selectively allowing passage from a non-secure region to a secure region. 4,586,441, Cl. 109-8.000.

Zeuch, Michael: *See*—
Klinger, Horst; Lehmann, Werner; and Zeuch, Michael, 4,586,470, Cl. 123-367.000.

Ziaylek, Theodore, Jr. Air tank support of the quick release type. 4,586,687, Cl. 248-313.000.

Zierhut, Lawrence G.: *See*—
Cosimini, Gregory J.; Lo, David S.; and Zierhut, Lawrence G., 4,587,636, Cl. 365-87.000.

Zinser Textilmaschinen GmbH: *See*—
Igel, Wolfgang, 4,586,326, Cl. 57-281.000.

Zoepfl, Frederick J.: *See*—
Randall, James C.; and Zoepfl, Frederick J., 4,586,995, Cl. 522-5.000.

Zondler, Helmut: *See*—
Schmid, Rolf; Zondler, Helmut; Fischer, Michael; and Stauffer, Werner, 4,587,311, Cl. 525-504.000.

Zysman, Alexandre: *See*—
Sebag, Henri; and Zysman, Alexandre, 4,587,321, Cl. 528-27.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF MAY, 1986

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., to Henry Filters, Inc. Compact universal drum filter settler. Re. 32,135, Cl. 210-260.000.

Dr.-Ing. Rudolf Hell GmbH: *See*—
Taudt, Heinz; and Gast, Uwe, Re. 32,139, Cl. 358-78.000.

Eastman Kodak Company: *See*—
Sandhu, M. Akram; Wright, John F.; and Molaire, Michel F., Re. 32,136, Cl. 528-302.000.

Eikonix Corporation: *See*—
Lianza, Thomas A., Re. 32,137, Cl. 250-578.000.

Fox, Robert J.: *See*—
Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., Re. 32,135, Cl. 210-260.000.

Gast, Uwe: *See*—
Taudt, Heinz; and Gast, Uwe, Re. 32,139, Cl. 358-78.000.

Gottschalk, Robert E., to Panavision, Incorporated. Motion picture camera. Re. 32,138, Cl. 352-72.000.

Guelde, Ted W.: *See*—
Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., Re. 32,135, Cl. 210-260.000.

Gutner, Kenneth H.; and Waxman, Jay S. Drawer slide assembly. Re. 32,134, Cl. 308-3.800.

Harms, Eugene H.: *See*—
Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., Re. 32,135, Cl. 210-260.000.

Henry Filters, Inc.: *See*—
Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., Re. 32,135, Cl. 210-260.000.

Hitachi, Ltd.: *See*—
Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, Re. 32,140, Cl. 364-431.120.

Koziol, Walter, to Modern Home Products Corp. Adjustable venturi tube assembly for a gas barbecue grill. Re. 32,133, Cl. 126-39.00E.

Lianza, Thomas A., to Eikonix Corporation. Graphical representation transducing. Re. 32,137, Cl. 250-578.000.

McEwen, Stephen N.: *See*—
Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., Re. 32,135, Cl. 210-260.000.

Modern Home Products Corp.: *See*—
Koziol, Walter, Re. 32,133, Cl. 126-39.00E.

Molaire, Michel F.: *See*—
Sandhu, M. Akram; Wright, John F.; and Molaire, Michel F., Re. 32,136, Cl. 528-302.000.

Morinaga, Shigeki: *See*—
Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, Re. 32,140, Cl. 364-431.120.

Nakamura, Hideo: *See*—
Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, Re. 32,140, Cl. 364-431.120.

Panavision, Incorporated: *See*—
Gottschalk, Robert E., Re. 32,138, Cl. 352-72.000.

Sandhu, M. Akram; Wright, John F.; and Molaire, Michel F., to Eastman Kodak Company. Electrostatographic developers comprising toners containing a polyester having p-hydroxybenzoic acid recurring units. Re. 32,136, Cl. 528-302.000.

Taudt, Heinz; and Gast, Uwe, to Dr.-Ing. Rudolf Hell GmbH. Method and arrangement for the avoidance of errors during the reproduction of an image pattern. Re. 32,139, Cl. 358-78.000.

Tokuda, Hiroastu; Morinaga, Shigeki; and Nakamura, Hideo, to Hitachi, Ltd. Electronic engine control apparatus. Re. 32,140, Cl. 364-431.120.

Waxman, Jay S.: *See*—
Gutner, Kenneth H.; and Waxman, Jay S., Re. 32,134, Cl. 308-3.800.

Wright, John F.: *See*—
Sandhu, M. Akram; Wright, John F.; and Molaire, Michel F., Re. 32,136, Cl. 528-302.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Black, Philip W.: *See*—
Lighty, Paul E.; Black, Philip W.; and Irven, John, B1 4,341,441, Cl. 350-96.300.

Blackburn, James R. Bicycle rack. B1 4,154,382, 5-6-86, Cl. 224-39.000.

Cochran, Chudleigh B., to Hughes Tool Co. Apparatus and method for cementing well liners. B1 3,934,652, 5-6-86, Cl. 166-285.000.

Dea, Stanley J. System for home wastewater treatment and disposal. B1 3,925,206, 5-6-86, Cl. 210-104.000.

Disselbeck, Dieter; Hilscher, Eduard; and Speler, Klaus, to Hoechst Aktiengesellschaft. Heat exchanger element. B1 4,230,175, 5-6-86, Cl. 165-46.000.

Hilscher, Eduard: *See*—
Disselbeck, Dieter; Hilscher, Eduard; and Speler, Klaus, B1 4,230,175, Cl. 165-46.000.

Hoechst Aktiengesellschaft: *See*—
Disselbeck, Dieter; Hilscher, Eduard; and Speler, Klaus, B1 4,230,175, Cl. 165-46.000.

Hughes Tool Co.: *See*—
Cochran, Chudleigh B., B1 3,934,652, Cl. 166-285.000.

International Standard Electric Corp.: *See*—
Lighty, Paul E.; Black, Philip W.; and Irven, John, B1 4,341,441, Cl. 350-96.300.

Irven, John: *See*—
Lighty, Paul E.; Black, Philip W.; and Irven, John, B1 4,341,441, Cl. 350-96.300.

Lighty, Paul E.; Black, Philip W.; and Irven, John, to International Standard Electric Corp. Method of making solid preforms and optical fibers drawn therefrom. B1 4,341,441, 5-6-86, Cl. 350-96.300.

Lipman Electric Company, Inc.: *See*—
Springston, Jefferson J., B1 4,302,162, Cl. 417-424.000.

Speler, Klaus: *See*—
Disselbeck, Dieter; Hilscher, Eduard; and Speler, Klaus, B1 4,230,175, Cl. 165-46.000.

Springston, Jefferson J., to Lipman Electric Company, Inc. Water pumping device. B1 4,302,162, 5-6-86, Cl. 417-424.000.

LIST OF DESIGN PATENTEES

Ahee, Albert T. Emblem for jewelry. 283,688, 5-6-86, Cl. D11-61.000.
Aihara, Takayuki, to Olympus Optical Co. Ltd. Container for a sample of liquid serum or the like. 283,728, 5-6-86, Cl. D24-29.000.
Airway Industries, Inc.: *See—*
Kim, Hyun S., 283,654, Cl. D3-76.000.
American Commercial, Incorporated: *See—*
Blake, Alfred; and Lax, Michael, 283,659, Cl. D7-13.000.
Blake, Alfred; and Lax, Michael, 283,660, Cl. D7-13.000.
Blake, Alfred; and Lax, Michael, 283,661, Cl. D7-13.000.
Blake, Alfred; and Lax, Michael, 283,662, Cl. D7-13.000.
Lax, Michael, 283,670, Cl. D7-320.000.
Murai, Toschio, 283,664, Cl. D7-30.000.
Murai, Toschio, 283,665, Cl. D7-30.000.
Winterling, Alfred, 283,663, Cl. D7-17.000.
Winterling, Alfred, 283,669, Cl. D7-319.000.
Barrett, Keith, to Dart & Kraft, Inc. Control panel and pedestal for automatic parts manipulator. 283,706, 5-6-86, Cl. D13-12.000.
Bass, Donald H. Fishing lure. 283,724, 5-6-86, Cl. D22-27.000.
Baxter Travenol Laboratories, Inc.: *See—*
Mahoney, Michael R., 283,725, Cl. D23-19.000.
Bell, Robert L., II. Bear sculpture. 283,691, 5-6-86, Cl. D11-158.000.
Benit, Brad J., to Berkley and Company, Inc. Pistol grip bait casting handle. 283,720, 5-6-86, Cl. D22-23.000.
Berg, Bengt F. A., to Stallinfabriken Bridon AB. Safety hook. 283,673, 5-6-86, Cl. D8-367.000.
Berkley and Company, Inc.: *See—*
Benit, Brad J., 283,720, Cl. D22-23.000.
Blake, Alfred; and Lax, Michael, to American Commercial, Incorporated. Wine glass. 283,659, 5-6-86, Cl. D7-13.000.
Blake, Alfred; and Lax, Michael, to American Commercial, Incorporated. Champagne flute. 283,660, 5-6-86, Cl. D7-13.000.
Blake, Alfred; and Lax, Michael, to American Commercial, Incorporated. Champagne flute. 283,661, 5-6-86, Cl. D7-13.000.
Blake, Alfred; and Lax, Michael, to American Commercial, Incorporated. Champagne glass. 283,662, 5-6-86, Cl. D7-13.000.
Breitschwerdt, Werner; van Winsen; and Sacco, Bruno, to Daimler-Benz Aktiengesellschaft. Automobile. 283,692, 5-6-86, Cl. D12-92.000.
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Candiliotis, Gerasimos, to Uniroyal Tire Company, Inc. Pneumatic tire tread and buttress. 283,696, 5-6-86, Cl. D12-147.000.
Candiliotis, Gerasimos, to Uniroyal Tire Company, Inc. Pneumatic tire tread and buttress. 283,697, 5-6-86, Cl. D12-147.000.
Candiliotis, Gerasimos, to Uniroyal Tire Company, Inc. Pneumatic tire tread and buttress. 283,699, 5-6-86, Cl. D12-147.000.
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Fortuna, Vincent E.; and MacLaughlin, Donald N., to Vercon, Inc. Packaging container. 283,677, 5-6-86, Cl. D9-349.000.
Fortuna, Vincent F.; and MacLaughlin, Donald N., to Vercon, Inc. Packaging container. 283,678, 5-6-86, Cl. D9-390.000.
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Walser, Ludwig, 283,687, Cl. D10-108.000.
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Jansen Schoonhoven, Jan G., to Vredestein Banden B.V. Tire. 283,703, 5-6-86, Cl. D12-147.000.
Jenkins, Stuart M.; and Weaver, John J., to De La Rue Systems Limited. Customer-operated cash dispenser. 283,745, 5-6-86, Cl. D99-28.000.
Jones, David A.; and Richards, Randall G., to Drackett Company, The. Toilet tank dispenser. 283,726, 5-6-86, Cl. D23-3.000.
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Kilman, Brenda J.; and Cowart, Betty J. Appliance for smoothing fiber applied to fingernails. 283,738, 5-6-86, Cl. D28-59.000.
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Mennes, David H. Lawn table. 283,656, 5-6-86, Cl. D6-480.000.
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Murai, Toschio, to American Commercial Incorporated. Saucer. 283,665, 5-6-86, Cl. D7-30.000.
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Raitmaa, Raimo. Sighting compass/vertical angle metering device. 283,682, 5-6-86, Cl. D10-62.000.
Raitmaa, Raimo. Sighting compass/vertical angle meter. 283,683, 5-6-86, Cl. D10-62.000.
Ramsey, Roger H., to Technicare Corporation. Nuclear magnetic resonance imaging system magnet housing. 283,729, 5-6-86, Cl. D24-1.100.
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Walser, Ludwig, to Inventio AG. Hall indicator panel for elevators. 283,686, 5-6-86, Cl. D10-108.000.
Walser, Ludwig, to Inventio AG. Elevator car operating panel. 283,687, 5-6-86, Cl. D10-108.000.
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Zilz, Robert F.; and Zilz, Randy R. Top water fish lure. 283,722, 5-6-86, Cl. D22-27.000.
600 Group Public Limited Company, The: *See*—
Cook, Peter H.; and Lunt, Brian R., 283,705, Cl. D13-12.000.

LIST OF PLANT PATENTEES

Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant named Citron. 5,736, 5-6-86, Cl. 74.000.

Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant named Thrill. 5,737, 5-6-86, Cl. 74.000.

Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant named Rave. 5,738, 5-6-86, Cl. 74.000.

Duffett, William E.; and Mack, Grace H., to Yoder Brothers, Inc. Chrysanthemum plant named Sunbeam. 5,739, 5-6-86, Cl. 78.000.

J. van Zelderen & Zn.: *See*—
van Zelderen, Gerald J., 5,735, Cl. 68.000.

Jackson & Perkins Company: *See*—
Warriner, William A., 5,734, Cl. 26.000.

Mack, Grace H.: *See*—
Duffett, William E.; and Mack, Grace H., 5,739, Cl. 78.000.

Morel et Cie S.N.C.: *See*—
Morel, Michel P.; and Morel, Vincent C., 5,740, Cl. 88.000.

Morel, Michel P.; and Morel, Vincent C., to Morel et Cie S.N.C. Dieffenbachia cv. Morlof. 5,740, 5-6-86, Cl. 88.000.

Morel, Vincent C.: *See*—
Morel, Michel P.; and Morel, Vincent C., 5,740, Cl. 88.000.

van Zelderen, Gerald J., to J. van Zelderen & Zn. Alstroemeria named Zelido. 5,735, 5-6-86, Cl. 68.000.

Warriner, William A., to Jackson & Perkins Company. Rose plant Jacinal. 5,734, 5-6-86, Cl. 26.000.

Yoder Brothers, Inc.: *See*—
Duffett, William E., 5,736, Cl. 74.000.
Duffett, William E., 5,737, Cl. 74.000.
Duffett, William E., 5,738, Cl. 74.000.
Duffett, William E.; and Mack, Grace H., 5,739, Cl. 78.000.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 6TH DAY OF MAY, 1986

Alter, Paul: *See*—
Vogel, Max A.; and Alter, Paul, H63, Cl. 250-491.100.

AT&T Bell Laboratories: *See*—
Beni, Gerard; Hackwood, Susan; Hornak, Lawrence A.; and Jackel, Janet L., H65, Cl. 414-730.000.
Maleis, Hanafy E., H64, Cl. 357-42.000.
White, Jonathan C., H66, Cl. 372-5.000.

Beni, Gerard; Hackwood, Susan; Hornak, Lawrence A.; and Jackel, Janet L., to AT&T Bell Laboratories. Dynamic optical sensing: Robotic system and manufacturing method utilizing same. H65, 5-6-86, Cl. 414-730.000.

Chandler, Thomas C.; Heimberger, Howard C.; and Patten, Thomas C., to United States of America, Air Force. Flow measurement device. H56, 5-6-86, Cl. 73-195.000.

Dainippon Screen Seizo Kabushiki Kaisha: *See*—
Mori, Noriaki, H67, Cl. 198-775.000.

Elkins, Jackie N.; Friedman, Steve; and Turnquist, David, to United States of America, Army. Long-life triggered spark gap. H60, 5-6-86, Cl. 313-595.000.

France, John H., to United States of America, Navy. Environmentally energized arm-fire device actuator. H68, 5-6-86, Cl. 102-224.000.

Friedman, Steve: *See*—
Elkins, Jacki N.; Friedman, Steve; and Turnquist, David, H60, Cl. 313-595.000.

Gabriel, William F.; and Hsiao, James K., to United States of America, United States. Partially adaptive array using bootlace lens. H57, 5-6-86, Cl. 343-376.000.

Hackwood, Susan: *See*—
Beni, Gerard; Hackwood, Susan; Hornak, Lawrence A.; and Jackel, Janet L., H65, Cl. 414-730.000.

Hedderich, John F., III: *See*—
Smith, Wayne W.; and Hedderich, John F., III, H58, Cl. 102-476.000.

Heimberger, Howard C.: *See*—
Chandler, Thomas C.; Heimberger, Howard C.; and Patten, Thomas C., H56, Cl. 73-195.000.

Hornak, Lawrence A.: *See*—
Beni, Gerard; Hackwood, Susan; Hornak, Lawrence A.; and Jackel, Janet L., H65, Cl. 414-730.000.

Hsiao, James K.: *See*—
Gabriel, William F.; and Hsiao, James K., H57, Cl. 343-376.000.

Jackel, Janet L.: *See*—
Beni, Gerard; Hackwood, Susan; Hornak, Lawrence A.; and Jackel, Janet L., H65, Cl. 414-730.000.

Kreuzmann, Alvin B.; and Palmer, Deborah A., to United States of America, Energy. Process for converting magnesium fluoride to calcium fluoride. H59, 5-6-86, Cl. 423-490.000.

Maleis, Hanafy E., to AT&T Bell Laboratories. Full-wave rectifier for CMOS IC chip. H64, 5-6-86, Cl. 357-42.000.

Mori, Noriaki, to Dainippon Screen Seizo Kabushiki Kaisha. Conveyor mechanism for thin plate. H67, 5-6-86, Cl. 198-775.000.

Palmer, Deborah A.: *See*—
Kreuzmann, Alvin B.; and Palmer, Deborah A., H59, Cl. 423-490.000.

Patten, Thomas C.: *See*—
Chandler, Thomas C.; Heimberger, Howard C.; and Patten, Thomas C., H56, Cl. 73-195.000.

Ramsey, Mark S.; and Watkins, Larry A. Method for improved mud pulse telemetry. H55, 5-6-86, Cl. 73-155.000.

Sanderson, Barry D., to United States of America, Navy. Closed loop binary digital communication system. H62, 5-6-86, Cl. 375-58.000.

Smith, Wayne W.; and Hedderich, John F., III, to United States of America, Army. Armor penetration projectile. H58, 5-6-86, Cl. 102-476.000.

Spignese, Salvatore, administrator: *See*—
Yuhash, Ladd, deceased; and Spignese, Salvatore, administrator, H61, Cl. 42-39.500.

Turnquist, David: *See*—
Elkins, Jackie N.; Friedman, Steve; and Turnquist, David, H60, Cl. 313-595.000.

United States of America
Air Force: *See*—
Chandler, Thomas C.; Heimberger, Howard C.; and Patten, Thomas C., H56, Cl. 73-195.000.
Army: *See*—
Elkins, Jackie N.; Friedman, Steve; and Turnquist, David, H60, Cl. 313-595.000.
Smith, Wayne W.; and Hedderich, John F., III, H58, Cl. 102-476.000.
Yuhash, Ladd, deceased; and Spignese, Salvatore, administrator, H61, Cl. 42-39.500.
Energy: *See*—
Kreuzmann, Alvin B.; and Palmer, Deborah A., H59, Cl. 423-490.000.
Vogel, Max A.; and Alter, Paul, H63, Cl. 250-491.100.
Navy: *See*—
France, John H., H68, Cl. 102-224.000.
Sanderson, Barry D., H62, Cl. 375-58.000.
United States: *See*—
Gabriel, William F.; and Hsiao, James K., H57, Cl. 343-376.000.

Vogel, Max A.; and Alter, Paul, to United States of America, Energy. Positioning apparatus. H63, 5-6-86, Cl. 250-491.100.

Watkins, Larry A.: *See*—
Ramsey, Mark S.; and Watkins, Larry A., H55, Cl. 73-155.000.

White, Jonathan C., to AT&T Bell Laboratories. Pulsed plasma generation of extreme ultraviolet radiation. H66, 5-6-86, Cl. 372-5.000.

Yuhash, Ladd, deceased; and Spignese, Salvatore, administrator, to United States of America, Army. Self supporting cartridge and weapon system therefor. H61, 5-6-86, Cl. 42-39.500.

CLASSIFICATION OF PATENTS

ISSUED MAY 6, 1986

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

105 4,586,198
114 4,586,196
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413 4,586,200

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CLASS 244

3.27 4,586,680
49 4,586,681
102 R 4,586,682
135 A 4,586,683
137 R 4,586,684
145 4,586,685

CLASS 248

1 4,586,686
313 4,586,687
538 4,586,688
570 4,586,689

CLASS 249

78 4,586,690

CLASS 250

202 4,587,414
204 4,587,415
4,587,416
214 AL 4,587,417
216 4,587,418
221 4,587,419
235 4,587,420
239 4,587,421
253 4,587,422
269 4,587,423
270 4,587,424
305 4,587,425
338 4,587,426
339 4,587,427
372 4,587,428
375 4,587,429
423 R 4,587,430
442.1 4,587,431
492.2 4,587,432
4,587,433
556 4,587,434
578 Re.32,137

CLASS 251

7 4,586,691
15 4,586,692
56 4,586,693
149.2 4,586,694

CLASS 252

34 4,587,025
47.5 4,587,026
73 4,587,027
76 4,587,028
91 4,587,029
92 4,587,030
135 4,587,031
174.17 4,587,032
184 4,587,034
301.4 F 4,587,035
301.4 H 4,587,036
500 4,587,037
511 4,587,038
4,587,039
519 4,587,040
572 4,587,041
582 4,587,042
626 4,587,043

CLASS 254

30 4,586,695
122 4,586,696

CLASS 256

65 4,586,697

CLASS 260

239 A 4,587,047
4,587,048
4,587,049
4,587,051
239.3 R 4,587,050
239.3 T 4,587,052
245.4 4,587,053
410.5 4,587,054
413 4,587,055
453 4,587,057
453 PC 4,587,056
502.5 F 4,587,061

CLASS 261

37 4,587,064

CLASS 264

1.5 4,587,065
22 4,587,066
63 4,587,067
4,587,068
102 4,587,069
122 4,587,070
210.7 4,587,071
297.8 4,587,072
515 4,587,073
516 4,587,074
573 4,587,075

CLASS 266

237 4,586,698
287 4,586,699

CLASS 267

105 4,586,700

CLASS 269

25 4,586,701
310 4,586,702

CLASS 270

39 4,586,703
46 4,586,704

CLASS 271

122 4,586,705

CLASS 272

73 4,586,706

CLASS 273

1 R 4,586,707
73 D 4,586,708
86 K 4,586,709
138 A 4,586,710
138 R 4,586,711
149 R 4,586,712
153 S 4,586,713
157 R 4,586,714
311 4,586,715
376 4,586,716

CLASS 277

15 4,586,717
22 4,586,718
41 4,586,719
152 4,586,720

CLASS 280

30 4,586,721
103 4,586,722
242 WC 4,586,723
412 4,586,724
414.1 4,586,725
432 4,586,726
607 4,586,727
707 4,586,728

CLASS 281

5 4,586,729
45 4,586,730

CLASS 285

4 4,586,731
12 4,586,732
4,586,733
340 4,586,734
354 4,586,735

CLASS 290

54 4,587,435

CLASS 292

202 4,586,736
216 4,586,737

CLASS 293

107 4,586,738
120 4,586,739

CLASS 294

1.1 4,586,740
19.1 4,586,741
86.4 4,586,743
87.2 4,586,742
92 4,586,744
150 4,586,745

CLASS 297

174 4,586,746
250 4,586,747
300 4,586,748
330 4,586,749
417 4,586,750
445 4,586,751

CLASS 299

4 4,586,752
43 4,586,753

CLASS 303

22 R 4,586,754
28 4,586,755
37 4,586,756

CLASS 305

35 R 4,586,757

CLASS 307

21 4,587,436
109 4,587,437
252 C 4,587,438
265 4,587,439
268 4,587,440
269 4,587,441
350 4,587,442
353 4,587,443
355 4,587,444
443 4,587,445
473 4,587,446
482 4,587,447
517 4,587,448

CLASS 308

3.8 Re.32,134
6 C 4,586,758

CLASS 310

154 4,587,449
155 4,587,450
208 4,587,451
328 4,587,452

CLASS 312

198 4,586,759
245 4,586,760
319 4,586,761
330 R 4,586,762

CLASS 313

25 4,587,453
331 4,587,454
346 DC 4,587,455
366 4,587,456

CLASS 315

64 4,587,457
111.01 4,587,458
158 4,587,459
174 4,587,460
224 4,587,461
260 4,587,462
307 4,587,463
382 4,587,464
4,587,465

CLASS 318

38 4,587,466
272 4,587,467
362 4,587,468
432 4,587,469
564 4,587,470
628 4,587,471
687 4,587,472
696 4,587,473
709 4,587,474

CLASS 323

241 4,587,475
276 4,587,476
312 4,587,477
316 4,587,478

CLASS 324

65 CR 4,587,479
73 PC 4,587,481
73 R 4,587,480
78 D 4,587,482
79 R 4,587,483
158 F 4,587,484
166 4,587,485
236 4,587,486
244 4,587,487
306 4,587,488
309 4,587,489
318 4,587,492
319 4,587,493
320 4,587,490

CLASS 329

122 4,587,498

CLASS 330

268 4,587,491
273 4,587,494
311 4,587,495

CLASS 331

1 A 4,587,496
116 R 4,587,497
176 4,587,499

CLASS 333

213 4,587,500

CLASS 335

80 4,587,501
85 4,587,502
135 4,587,503
216 4,587,504
266 4,587,505

CLASS 336

178 4,587,506
4,587,507

CLASS 337

343 4,587,508

CLASS 338

32 H 4,587,509
128 4,587,510

CLASS 339

6 R 4,586,763
17 M 4,586,764
44 R 4,586,765
45 M 4,586,766
4,586,768
45 R 4,586,767
59 R 4,586,769
74 R 4,586,770
75 MP 4,586,771
4,586,772
91 R 4,586,773
94 M 4,586,774
97 R 4,586,775
105 4,586,776
154 A 4,586,777
221 R 4,586,778

CLASS 340

19 R 4,587,511
52 D 4,587,512
347 DD 4,587,514
347 P 4,587,513
506 4,587,515
539 4,587,516
542 4,587,517
603 4,587,518
711 4,587,519
712 4,587,520
825.3 4,587,521
902 4,587,522

CLASS 343

7.3 4,587,523
729 4,587,524
821 4,587,525
883 4,587,526

CLASS 346

75 4,587,527
4,587,528
76 PH 4,587,529
4,587,530
108 4,587,531
134 4,587,532
135.1 4,587,533
140 R 4,587,534
4,587,535
160 4,587,536
208 4,587,537
218 4,587,538
220 4,587,539

CLASS 350

3.7 4,586,781
3.70 4,586,780
6.5 4,586,782
96.15 4,586,783
4,586,784
96.28 4,586,785
96.30 B1 4,341,441
169 4,586,786
257 4,586,787
283 4,586,788
336 4,586,789
337 4,586,790
341 4,586,791
357 4,586,792
364 4,586,779
426 4,586,793
520 4,586,794
620 4,586,795

CLASS 351

206 4,586,796

CLASS 352

72 Re.32,138

CLASS 353

109 4,586,797
120 4,586,798

CLASS 354

1 4,586,799
21 4,586,800
173.1 4,586,801
219 4,586,802
313 4,586,803
322 4,586,804
323 4,586,805
403 4,586,806

CLASS 355

3 BE 4,586,807
8 4,586,808
10 4,586,809
12 4,586,810
14 R 4,586,811
24 4,586,812
50 4,586,813
55 4,586,814
76 4,586,815

CLASS 356

73.1 4,586,816
124.5 4,586,817
244 4,586,818
301 4,586,819
317 4,586,820
363 4,586,821
394 4,586,822

CLASS 357

22 4,587,540
4,587,541
23.6 4,587,542
25 4,587,543
30 4,587,544
38 4,587,545
4,587,546
4,587,656
59 4,587,547
70 4,587,548
71 4,587,549
79 4,587,550

CLASS 358

10 4,587,551
28 4,587,552
64 4,587,553
74 4,587,554
78 Re.32,139
111 4,587,555
140 4,587,556
4,587,557
160 4,587,558
4,587,559
166 4,587,560
167 4,587,561
212 4,587,562
213 4,587,563
4,587,564
235 4,587,565
242 4,587,566
248 4,587,567
293 4,587,568
296 4,587,569
342 4,587,570

CLASS 360

2 4,587,571
10.3 4,587,573
14.3 4,587,572
4,587,574
15 4,587,575
33.1 4,587,576
72.2 4,587,577
74.1 4,587,578
75 4,587,579
77 4,587,580
4,587,581
93 4,587,582
4,587,583
96.3 4,587,584
97 4,587,585
99 4,587,586
109 4,587,587

CLASS 361

54 4,587,588
56 4,587,589
94 4,587,590
127 4,587,592
235 4,587,591
383 4,587,593
4,587,594
388 4,587,595
398 4,587,596

CLASS 362

20 4,587,597
72 4,587,598
101 4,587,599
219 4,587,600
235 4,587,601
375 4,587,602
427 4,587,603

CLASS 363

17 4,587,604
41 4,587,605
68 4,587,606

CLASS 364

167 4,587,607
191 4,587,608
200 4,587,609
4,587,610
4,587,611
4,587,612
4,587,613
431.02 4,587,614
431.11 4,587,615
431.12 Re.32,140
475 4,587,616
507 4,587,617
513 4,587,618
552 4,587,619
561 4,587,622
571 4,587,623
4,587,624
574 4,587,620
577 4,587,621
578 4,587,625
726 4,587,626
754 4,587,627
900 4,587,628
4,587,629
4,587,630
4,587,631
4,587,632
4,587,633
4,587,634
4,587,635

CLASS 365

87 4,587,636
189 4,587,637
200 4,587,638
4,587,639
229 4,587,640

CLASS 366

3 4,586,823
34 4,586,824
137 4,586,825
144 4,586,826

CLASS 367

30 4,587,641
40 4,587,642

CLASS 368

282 4,586,827

CLASS 369

32 4,587,643
44 4,587,644
75.1 4,587,645
248 4,587,646
270 4,587,647
275 4,587,648

CLASS 370

58 4,587,649
86 4,587,650
88 4,587,651
110.1 4,587,652

CLASS 371

6 4,587,653
12 4,587,655
14 4,587,654

CLASS 372

74 4,587,657

CLASS 373

95 4,587,658
96 4,587,659
108 4,587,660

CLASS 374

16 4,586,828
144 4,586,829

CLASS 375

1 4,587,661
4,587,662

CLASS 376

203 4,587,076
215 4,587,077
267 4,587,078
282 4,587,079
4,587,080
287 4,587,081
291 4,587,082
313 4,587,083
336 4,587,084
4,587,085
399 4,587,086
417 4,587,087
419 4,587,088
428 4,587,089
4,587,090
434 4,587,091
438 4,587,092
444 4,587,093
451 4,587,094

CLASS 377

2 4,587,663
48 4,587,664
116 4,587,665

CLASS 378

47 4,587,666
58 4,587,667
197 4,587,668

CLASS 381

32 4,587,669
43 4,587,670

CLASS 384

121 4,586,830
297 4,586,831
455 4,586,832
531 4,586,833

CLASS 400

120 4,586,834
121 4,586,835
144.2 4,586,836
216.2 4,586,837
320 4,586,838
619 4,586,839

CLASS 403

228 4,586,840
230 4,586,841
246 4,586,842
252 4,586,843
287 4,586,844
354 4,586,845

CLASS 404

6 4,586,846
117 4,586,847

CLASS 405

60.5 4,586,848
128 4,586,849
163 4,586,850
295 4,586,851

CLASS 406

14 4,586,852
4,586,853
153 4,586,854

CLASS 407

55 4,586,855

CLASS 408

92 4,586,856
206 4,586,857
224 4,586,858
240 4,586,859

CLASS 409

233 4,586,860

CLASS 411

311 4,586,861
387 4,586,862

CLASS 413

14 4,586,863

CLASS 414

433 4,586,864
519 4,586,865
563 4,586,866
723 4,586,867
735 4,586,868
736 4,586,869

CLASS 415

1 4,586,870
90 4,586,871
219 C 4,586,872

CLASS 417

54 4,586,873
222 4,586,874
228 4,586,875
269 4,586,876
365 4,586,877
407 4,586,878
411 4,586,879
424 4,586,880
B1 4,302,162
460 4,586,881
477 4,586,882
4,586,883

CLASS 418

43 4,586,884
61 B 4,586,885

CLASS 419

13 4,587,095
27 4,587,096

CLASS 420

473 4,587,097

CLASS 422

7 4,587,098
56 4,587,099
4,587,100
4,587,101
4,587,102
67 4,587,103
94 4,587,104
98 4,587,105

CLASS 423

8 4,587,106
10 4,587,107
11 4,587,108
15 4,587,109
30 4,587,110
112 4,587,111
242 4,587,112
244 4,587,113
247 4,587,114
329 4,587,115
415 A 4,587,116

CLASS 424

15 4,587,117
19 4,587,118
48 4,587,119
57 4,587,120
87 4,587,121
101 4,587,122
195.1 4,587,123
4,587,124

CLASS 425

123 4,586,886
144 4,586,887
362 4,586,888
456 4,586,889
458 4,586,890
526 4,586,891
531 4,586,892

CLASS 426

3 4,587,125
19 4,587,126
46 4,587,127
303 4,587,128
534 4,587,129
564 4,587,130
603 4,587,131
640 4,587,132

CLASS 427

9 4,587,133
10 4,587,134
13 4,587,135
54.1 4,587,136
4,587,137
88 4,587,138
130 4,587,139
372.2 4,587,140
379 4,587,141

CLASS 428

15 4,587,142
36 4,587,144
4,587,145
41 4,587,146
59 4,587,147
88 4,587,148
90 4,587,149
141 4,587,150
156 4,587,151
195 4,587,152
4,587,154
4,587,155
196 4,587,153
207 4,587,156
216 4,587,157
219 4,587,158
251 4,587,159
288 4,587,160
4,587,161
290 4,587,162
292 4,587,163
314.4 4,587,164
334 4,587,165
336 4,587,166
352 4,587,167
369 4,587,168
413 4,587,169
425.9 4,587,170
448 4,587,171
450 4,587,172
457 4,587,173
552 4,587,174
596 4,587,175
611 4,587,176
614 4,587,177
615 4,587,178
694 4,587,179

CLASS 429

8 4,587,180
59 4,587,181
94 4,587,182
176 4,587,183

CLASS 430

5 4,587,184
4,587,185
14 4,587,186
57 4,587,187
58 4,587,188
59 4,587,189
85 4,587,190
97 4,587,191
117 4,587,192
126 4,587,193
138 4,587,194
139 4,587,195
192 4,587,196
196 4,587,197
201 4,587,198
260 4,587,199
281 4,587,200
284 4,587,201
320 4,587,202
325 4,587,203
4,587,204
326 4,587,205
348 4,587,206
389 4,587,207
507 4,587,208
526 4,587,209
555 4,587,210
619 4,587,211

CLASS 431

76 4,586,893
158 4,586,894

CLASS 432

2 4,586,895
9 4,586,896
121 4,586,897
122 4,586,898
148 4,586,899

CLASS 433

96 4,586,900
164 4,586,901
177 4,586,902

CLASS 434

114 4,586,903
4,586,904
307 4,586,905
364 4,586,906

CLASS 435

7 4,587,212
39 4,587,213
70 4,587,214
96 4,587,215
123 4,587,216
155 4,587,217
253 4,587,218
288 4,587,219

CLASS 436

66 4,587,220
500 4,587,221
509 4,587,222
536 4,587,223

CLASS 440

49 4,586,907
89 4,586,908
112 4,586,909

CLASS 446

220 4,586,910
376 4,586,911
397 4,586,912

CLASS 474

80 4,586,913
160 4,586,914
205 4,586,915

CLASS 493

10 4,586,916
241 4,586,917

CLASS 494

20 4,586,918

CLASS 501

4 4,587,224
105 4,587,225

CLASS 502

5 4,587,226
153 4,587,227
185 4,587,228
225 4,587,230
243 4,587,229
304 4,587,231
400 4,587,232

CLASS 514

15 4,587,233
19 4,587,234
178 4,587,235
179 4,587,236
183 4,587,237
4,587,238
184 4,587,239
188 4,587,240
192 4,587,241
211 4,587,242
214 4,587,243
219 4,587,244
221 4,587,245
222 4,587,246
4,587,247
255 4,587,248
265 4,587,249
278 4,587,250
281 4,587,251
282 4,587,252
289 4,587,253
326 4,587,254
345 4,587,255
369 4,587,256
392 4,587,257
412 4,587,258
469 4,587,259
532 4,587,260
542 4,587,261
548 4,587,262
553 4,587,263
557 4,587,264
562 4,587,265
635 4,587,266
769 4,587,267
774 4,587,268

CLASS 521

38 4,587,269
58 4,587,270
60 4,587,271
86 4,587,272
107 4,587,273
163 4,587,275

CLASS 522

5 4,586,995
7 4,586,996
34 4,587,276
126 4,587,274

CLASSIFICATION OF PATENTS

CLASS 523

136 4,587,277
200 4,587,278
206 4,587,279
222 4,587,280
500 4,587,281
508 4,587,282

CLASS 524

3 4,587,283
17 4,587,284
78 4,587,285
375 4,587,286
404 4,587,287
405 4,587,033
425 4,587,288
505 4,587,289
558 4,587,290
595 4,587,291

CLASS 525

49 4,587,293
53 4,587,294
57 4,587,295
61 4,587,296
64 4,587,297
67 4,587,298
92 4,587,299
95 4,587,300
123 4,587,301
237 4,587,302
240 4,587,303
285 4,587,304
33..9 4,587,305
354 4,587,306
362 4,587,307
373 4,587,308
419 4,587,309
426 4,586,997
462 4,587,310
504 4,587,311
535 4,587,312

CLASS 526

75 4,587,313
88 4,587,314
247 4,587,315
4,587,316
259 4,587,317
282 4,587,318

CLASS 527

313 4,587,319

CLASS 528

23 4,587,320
27 4,587,321
60 4,587,322
66 4,587,323
108 4,587,324
172 4,587,325
176 4,587,326
215 4,587,327
299 4,587,328
302 Re.32,136
363 4,587,329
490 4,587,330

CLASS 530

211 4,587,044
328 4,587,045
330 4,587,046

CLASS 534

606 4,587,292

CLASS 536

55 4,587,331
102 4,587,332

CLASS 544

21 4,587,333
49 4,587,335
105 4,587,336
192 4,587,334
194 4,587,337
197 4,587,338
225 4,587,339
258 4,587,340
324 4,587,341
4,587,342

CLASS 546

116 4,587,343

CLASS 548

205 4,587,344
212 4,587,345
260 4,587,346
317 4,587,347
378 4,587,348
491 4,587,349

CLASS 549

245 4,587,350
333 4,587,351
335 4,587,352
470 4,587,353

CLASS 556

146 4,587,063
417 4,587,354

CLASS 558

133 4,587,062
304 4,587,060
464 4,587,059

CLASS 560

347 4,587,058

CLASS 562

414 4,587,355
455 4,587,356
461 4,587,357

CLASS 564

3 4,587,358
8 4,587,359
92 4,587,360
013 4,587,362
179 4,587,361

CLASS 568

357 4,587,363
451 4,587,364
619 4,587,365

CLASS 570

172 4,587,366
216 4,587,367

CLASS 585

12 4,587,368
259 4,587,369
450 4,587,370
467 4,587,371
606 4,587,372
639 4,587,373
670 4,587,374
671 4,587,375

CLASS 604

9 4,586,919
29 4,586,920
49 4,586,921
85 4,586,922
95 4,586,923
115 4,586,924
251 4,586,925
272 4,586,926
342 4,586,927
408 4,586,928

CLASS 623

5 4,586,929
6 4,586,930
9 4,586,931
16 4,586,932
20 4,586,933

CLASSIFICATION OF DESIGNS

D2— 190 283,652
426 283,653
D3— 76 283,654
D6— 370 283,655
480 283,656
511 283,657
617 283,658
D7— 13 283,659
283,660
283,661
283,662
17 283,663
30 283,664
283,665
38 283,666
39 283,667
149 283,668
319 283,669
320 283,670
351 283,671
D8— 331 283,672
367 283,673
373 283,674
396 283,675
D9— 344 283,676
349 283,677
390 283,678
425 283,679
D10— 24 283,680
32 283,681
62 283,682
283,683
106 283,684
108 283,685
283,686
283,687
D11— 61 283,688
157 283,690
158 283,691
D12— 92 283,692
110 283,689
140 283,693
146 283,694
283,695
147 283,696
283,697
283,698
283,699
283,700
283,701
283,702
283,703
156 283,704
D13— 12 283,705
283,706
D14— 53 283,707
283,708
64 283,709
71 283,710
100 283,711
D15— 139 283,712
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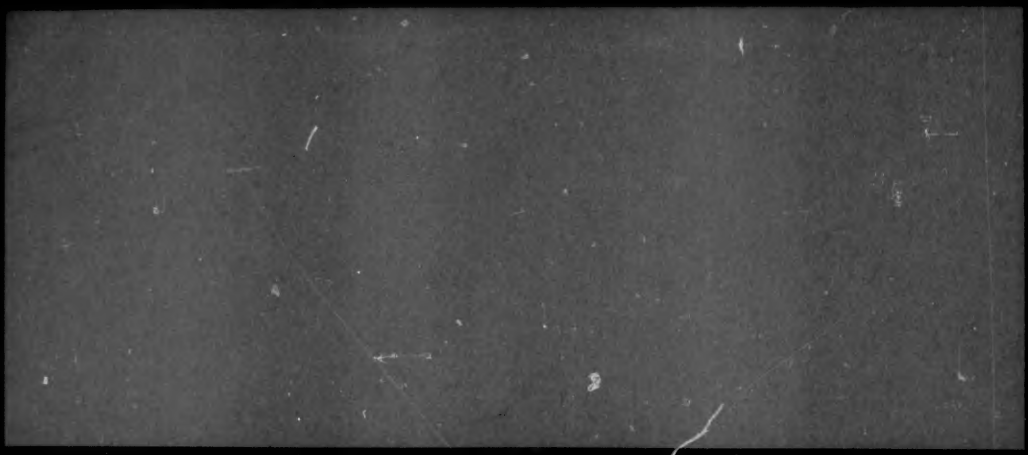

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